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# Commit 9c1110e



6 people authored on Jun 3, 2025 · ✖ 24 / 26 · Partially verified

```
[3.10] gh-135034: Normalize link targets in tarfile, add
os.path.realpath(strict='allow_missing') (GH-135037) (#135070)

Addresses CVEs 2024-12718, 2025-4138, 2025-4330, and 2025-4517.
(cherry picked from commit 3612d8f)
(cherry picked from commit c358142)
(cherry picked from commit 371b4ea)

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```

3.10 (#135070) · v3.10.20 ... v3.10.18

1 parent [c71ea4b](#) commit 9c1110e

**11 files changed** +944 -134 ●●●●● ●

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Doc/library/os.path.rst

```

@@ -352,10 +352,26 @@ the :mod:`glob` module.)
352 352     links encountered in the path (if they are supported by the operating
353 353     system).
354 354
355 -   If a path doesn't exist or a symlink loop is encountered, and strict is
356 -   ``True``, :exc:`OSError` is raised. If strict is ``False``, the path is
357 -   resolved as far as possible and any remainder is appended without checking
358 -   whether it exists.
355 +   By default, the path is evaluated up to the first component that does not
356 +   exist, is a symlink loop, or whose evaluation raises :exc:`OSError`.
357 +   All such components are appended unchanged to the existing part of the path.
358 +
359 +   Some errors that are handled this way include "access denied", "not a
360 +   directory", or "bad argument to internal function". Thus, the
361 +   resulting path may be missing or inaccessible, may still contain
362 +   links or loops, and may traverse non-directories.
363 +
364 +   This behavior can be modified by keyword arguments:
365 +
366 +   If strict is ``True``, the first error encountered when evaluating the
367 +   path is
367 +   re-raised.
368 +   In particular, :exc:`FileNotFoundError` is raised if path does not exist,
```

```

369 + or another :exc:`OSError` if it is otherwise inaccessible.
370 +
371 + If *strict* is :py:data:`os.path.ALLOW_MISSING`, errors other than
372 + :exc:`FileNotFoundError` are re-raised (as with ``strict=True``).
373 + Thus, the returned path will not contain any symbolic links, but the named
374 + file and some of its parent directories may be missing.

```

359 375

360 376 .. `note::`

```

361 377     This function emulates the operating system's procedure for making a path
@@ -374,6 +390,15 @@ the :mod:`glob` module.)

```

374 390 .. `versionchanged:: 3.10`375 391 The `*strict*` parameter was added.

376 392

393 + .. `versionchanged:: next`

```

394 +     The :py:data:`~os.path.ALLOW_MISSING` value for the *strict* parameter
395 +     was added.
396 +

```

397 + .. `data:: ALLOW_MISSING`

398 +

399 + Special value used for the `*strict*` argument in `:func:`realpath``.

400 +

401 + .. `versionadded:: next`

377 402

378 403 .. `function:: relpath(path, start=os.curdir)`

379 404



Doc/library/tarfile.rst



```

@@ -237,6 +237,15 @@ The :mod:`tarfile` module defines the following
exceptions:

```

```

237 237     Raised to refuse extracting a symbolic link pointing outside the
destination

```

```

238 238     directory.
239 239

```

240 + .. `exception:: LinkFallbackError`

241 +

```

242 +     Raised to refuse emulating a link (hard or symbolic) by extracting another
243 +     archive member, when that member would be rejected by the filter location.
244 +

```

```

The exception that was raised to reject the replacement member is
available

```

245	+	as <code>:attr:~!BaseException.__context__`.</code>
246	+	
247	+	<code>.. versionadded:: next</code>
248	+	
240	249	
241	250	The following constants are available at the module level:
242	251	
		@@ -954,6 +963,12 @@ reused in custom filters:
954	963	Implements the <code>``'data'``</code> filter.
955	964	In addition to what <code>``tar_filter``</code> does:
956	965	
966	+	- Normalize link targets ( <code>:attr:~TarInfo.linkname`)</code> using
967	+	<code>:func:~os.path.normpath`.</code>
968	+	Note that this removes internal <code>``..``</code> components, which may change the
969	+	meaning of the link if the path in <code>:attr:~!TarInfo.linkname`</code> traverses
970	+	symbolic links.
971	+	
957	972	- <code>:ref:~Refuse &lt;tarfile-extraction-refuse&gt;`</code> to extract links (hard or soft)
958	973	that link to absolute paths, or ones that link outside the destination.
959	974	
		@@ -982,6 +997,10 @@ reused in custom filters:
982	997	
983	998	Return the modified <code>``TarInfo``</code> member.
984	999	
1000	+	<code>.. versionchanged:: next</code>
1001	+	
1002	+	Link targets are now normalized.
1003	+	
985	1004	
986	1005	<code>.. _tarfile-extraction-refuse:</code>
987	1006	
		@@ -1008,6 +1027,7 @@ Here is an incomplete list of things to consider:
1008	1027	* Extract to a <code>:func:~new temporary directory &lt;tempfile.mkdtemp&gt;`</code>
1009	1028	to prevent e.g. exploiting pre-existing links, and to make it easier to
1010	1029	clean up after a failed extraction.
1030	+	* Disallow symbolic links if you do not need the functionality.
1011	1031	* When working with untrusted data, use external (e.g. OS-level) limits on
1012	1032	disk, memory and CPU usage.

1013 1033 \* Check filenames against an allow-list of characters



Doc/whatsnew/3.10.rst



@@ -2394,3 +2394,37 @@ email

2394 2394 check if the `*strict*` parameter is available.

2395 2395 (Contributed by Thomas Dwyer and Victor Stinner for :gh:`102988` to improve  
2396 2396 the CVE-2023-27043 fix.)

2397 +

2398 +

2399 + Notable changes in 3.10.18

2400 + =====

2401 +

2402 + `os.path`

2403 + -----

2404 +

2405 + \* The `*strict*` parameter to `:func:`os.path.realpath`` accepts a new value,  
2406 + `:data:`os.path.ALLOW_MISSING``.

2407 + If used, errors other than `:exc:`FileNotFoundError`` will be re-raised;  
2408 + the resulting path can be missing but it will be free of symlinks.

2409 + (Contributed by Petr Viktorin for CVE 2025-4517.)

2410 +

2411 + `tarfile`

2412 + -----

2413 +

2414 + \* `:func:`~tarfile.data_filter`` now normalizes symbolic link targets in order  
2415 + to

2416 + avoid path traversal attacks.

2417 + (Contributed by Petr Viktorin in :gh:`127987` and CVE 2025-4138.)

2418 + \* `:func:`~tarfile.TarFile.extractall`` now skips fixing up directory  
2419 + attributes

2420 + when a directory was removed or replaced by another kind of file.

2421 + (Contributed by Petr Viktorin in :gh:`127987` and CVE 2024-12718.)

2422 + \* `:func:`~tarfile.TarFile.extract`` and `:func:`~tarfile.TarFile.extractall``  
2423 + now (re-)apply the extraction filter when substituting a link (hard or  
2424 + symbolic) with a copy of another archive member, and when fixing up  
2425 + directory attributes.

2426 + The former raises a new exception, `:exc:`~tarfile.LinkFallbackError``.

(Contributed by Petr Viktorin for CVE 2025-4330 and CVE 2024-12718.)

\* `:func:`~tarfile.TarFile.extract`` and `:func:`~tarfile.TarFile.extractall``

```

2427 + no longer extract rejected members when
2428 + :func:`~tarfile.TarFile.errorlevel` is zero.
2429 + (Contributed by Matt Prodan and Petr Viktorin in :gh:`112887`
2430 + and CVE 2025-4435.)

```

Lib/genericpath.py

```

↑... @@ -8,7 +8,7 @@
8 8
9 9     __all__ = ['commonprefix', 'exists', 'getatime', 'getctime', 'getmtime',
10 10             'getsize', 'isdir', 'isfile', 'samefile', 'sameopenfile',
11 11             'samestat']
11 +             'samestat', 'ALLOW_MISSING']
12 12
13 13
14 14     # Does a path exist?
↓...
↑... @@ -153,3 +153,12 @@ def _check_arg_types(funcname, *args):
153 153             f'os.PathLike object, not
           {s.__class__.__name__!r}') from None
154 154         if hasstr and hasbytes:
155 155             raise TypeError("Can't mix strings and bytes in path components") from
           None
156 +
157 + # A singleton with a true boolean value.
158 + @object.__new__
159 + class ALLOW_MISSING:
160 +     """Special value for use in realpath()."""
161 +     def __repr__(self):
162 +         return 'os.path.ALLOW_MISSING'
163 +     def __reduce__(self):
164 +         return self.__class__.__name__

```

Lib/ntpath.py

```

↑... @@ -30,7 +30,8 @@
30 30             "ismount", "expanduser", "expandvars", "normpath", "abspath",
31 31             "curdir", "pardir", "sep", "pathsep", "defpath", "altsep",
32 32
           "extsep", "devnull", "realpath", "supports_unicode_filenames", "relpath",
33 33             "samefile", "sameopenfile", "samestat", "commonpath"]

```



```

643 645         path = _getfinalpathname(path)
644 646         return join(path, tail) if tail else path
645 -         except OSError as ex:
647 +         except ignored_error as ex:
646 648             if ex.winerror not in allowed_winerror:
647 649                 raise
648 650             try:
649 651                 # The OS could not resolve this path fully, so we attempt
650 652                 # to follow the link ourselves. If we succeed, join the
651 653                 tail
652                 # and return.
652 -         new_path = _readlink_deep(path)
654 +         new_path = _readlink_deep(path,
655 +                                 ignored_error=ignored_error)
653 656             if new_path != path:
654 657                 return join(new_path, tail) if tail else new_path
655 -         except OSError:
658 +         except ignored_error:
656 659             # If we fail to readlink(), let's keep traversing
657 660             pass
658 661             path, name = split(path)
683 686             if normcase(path) == normcase(devnull):
684 687                 return '\\\\.\\NUL'
685 688             had_prefix = path.startswith(prefix)
689 +
690 +             if strict is ALLOW_MISSING:
691 +                 ignored_error = FileNotFoundError
692 +                 strict = True
693 +             elif strict:
694 +                 ignored_error = ()
695 +             else:
696 +                 ignored_error = OSError
697 +
686 698             if not had_prefix and not isabs(path):
687 699                 path = join(cwd, path)
688 700             try:
689 701                 path = _getfinalpathname(path)
690 702                 initial_winerror = 0

```

```

691 -         except OSError as ex:
692 -             if strict:
693 -                 raise
703 +         except ignored_error as ex:
694 704             initial_winerror = ex.winerror
695 -         path = _getfinalpathname_nonstrict(path)
705 +         path = _getfinalpathname_nonstrict(path,
706 +             ignored_error=ignored_error)
696 707         # The path returned by _getfinalpathname will always start with \\?\ -
697 708         # strip off that prefix unless it was already provided on the original
698 709         # path.

```

Lib/posixpath.py

```

@@ -35,7 +35,7 @@
35 35         "samefile", "sameopenfile", "samestat",
36 36         "curdir", "pardir", "sep", "pathsep", "defpath", "altsep", "extsep",
37 37         "devnull", "realpath", "supports_unicode_filenames", "relpath",
38 -         "commonpath"]
38 +         "commonpath", "ALLOW_MISSING"]
39 39
40 40
41 41     def _get_sep(path):

```

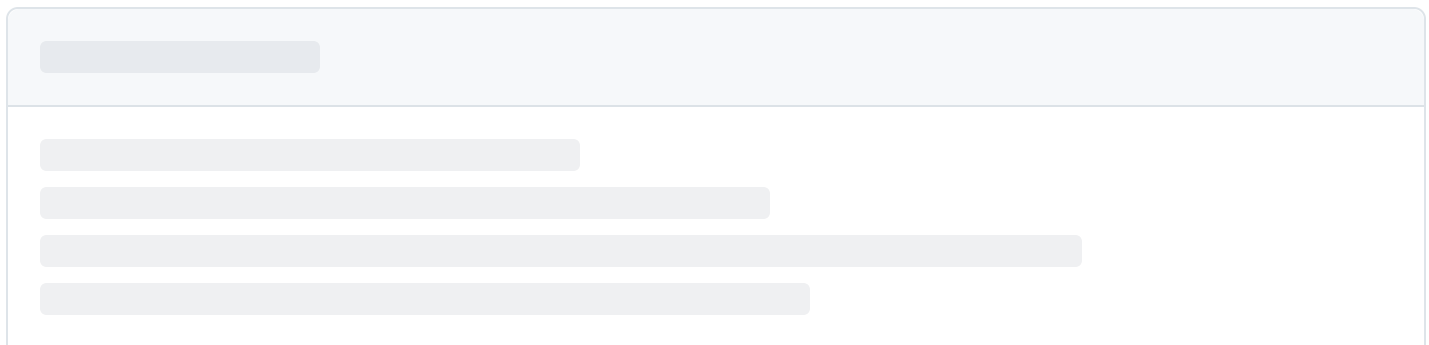
@@ -407,6 +407,15 @@ def \_joinrealpath(path, rest, strict, seen):

```

407 407         sep = '/'
408 408         curdir = '.'
409 409         pardir = '..'
410 +         getcwd = os.getcwd
411 +         if strict is ALLOW_MISSING:
412 +             ignored_error = FileNotFoundError
413 +         elif strict:
414 +             ignored_error = ()
415 +         else:
416 +             ignored_error = OSError
417 +
418 +         maxlinks = None
419 419
420 420         if isabs(rest):
421 421             rest = rest[1:]

```

```
@@ -429,9 +438,7 @@ def _joinrealpath(path, rest, strict, seen):
429 438         newpath = join(path, name)
430 439         try:
431 440             st = os.lstat(newpath)
432 -         except OSError:
433 -             if strict:
434 -                 raise
441 +         except ignored_error:
435 442             is_link = False
436 443         else:
437 444             is_link = stat.S_ISLNK(st.st_mode)
```



Comments 0