

Corrigindo Bugs no CPython

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Só entre nós...

Python tem bugs...

(não contem pra ninguém 😜)

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O Bug

```
RuntimeError: dictionary changed size during iteration
  File "python3.5/runpy.py", line 170, in _run_module_as_main
    "__main__", mod_spec)
  File "python3.5/runpy.py", line 85, in _run_code
    exec(code, run_globals)

[ ...segue... ]

  File "requests/sessions.py", line 531, in get
    return self.request('GET', url, **kwargs)
  File "requests/sessions.py", line 509, in request
    prep.url, proxies, stream, verify, cert
  File "requests/sessions.py", line 686, in merge_environment_settings
    env_proxies = get_env_proxies(url, no_proxy=no_proxy)
  File "requests/utils.py", line 696, in get_env_proxies
    return getproxies()
  File "urllib/request.py", line 2393, in getproxies_environment
    for name, value in os.environ.items():
  File "_collections_abc.py", line 676, in __iter__
    for key in self._mapping:
  File "python3.5/os.py", line 702, in __iter__
    for key in self._data:
```

O Bug

Race condition durante a iteração sobre as variáveis de ambiente do sistema operacional

Implementando uma solução

... antes de submeter o bug...

Tentativa #1

- Copia o dicionário antes de iterar sobre ele

```
1 diff --git a/Lib/os.py b/Lib/os.py
2 index e293eca..5d28572 100644
3 --- a/Lib/os.py
4 +++ b/Lib/os.py
5 @@ -697,7 +697,8 @@ class _Environ(MutableMapping):
6         raise KeyError(key) from None
7
8     def __iter__(self):
9 -     for key in self._data:
10 +     data = dict(self._data)
11 +     for key in data:
12         yield self.decodekey(key)
13
14     def __len__(self):
```

Tentativa #1

(fazer teste)

- Copia o dicionário antes de iterar sobre ele

```
15 diff --git a/Lib/test/test_os.py b/Lib/test/test_os.py
16 index 746b3f8..9cbe4b9 100644
17 --- a/Lib/test/test_os.py
18 +++ b/Lib/test/test_os.py
19 @@ -828,6 +828,21 @@ class EnvironTests(mapping_tests.BasicTestMappingProtocol):
20         self.assertIs(cm.exception.args[0], missing)
21         self.assertTrue(cm.exception.__suppress_context__)
22
23 +     def test_iter_error_when_os_environ_changes(self):
24 +         def _iter_environ_change():
25 +             for key, value in os.environ.items():
26 +                 yield key, value
27 +
28 +         iter_environ = _iter_environ_change()
29 +         key, value = next(iter_environ) # start iteration over os.environ
30 +
31 +         # add a new key in os.environ mapping
32 +         new_key = "__{}".format(key)
33 +         os.environ[new_key] = value
34 +
35 +         next(iter_environ) # force iteration over modified mapping
36 +         self.assertEqual(os.environ[new_key], value)
37 +
38
39 class WalkTests(unittest.TestCase):
```

Tentativa #1

The screenshot shows a web browser window with the URL `bugs.python.org/issue30441`. The page is the Python bug tracker interface. On the left is a sidebar with navigation links like 'PYTHON HOME', 'ABOUT', 'NEWS', 'DOCUMENTATION', 'DOWNLOADS', 'COMMUNITY', 'FOUNDATION', 'DEVELOPER'S GUIDE', and 'ISSUE TRACKER'. The main content area is titled 'Issue30441' and contains the following sections:

- classification**:
 - Title:** os.environ raises RuntimeError: dictionary changed size during iteration
 - Type:** behavior | **Stage:** resolved
 - Components:** Library (Lib) | **Versions:** Python 3.7, Python 3.6, Python 3.5
- process**:
 - Status:** closed | **Resolution:** fixed
 - Dependencies:** | **Supersedes:**
 - Assigned To:** | **Nosy List:** Danilo Shiga, Jelle Zijlstra, mark.dickinson, martin.panter, osantana, pitrou, serhiy.storchaka
 - Priority:** normal | **Keywords:** patch
- Created on 2017-05-23 14:35 by osantana, last changed 2017-07-05 03:46 by osantana. This issue is now closed.**
- Files**:

File name	Uploaded	Description	Edit
fix_os_environ_iteration_issue.diff	osantana, 2017-05-23 14:35	patch with fix and test	
fix_os_environ_iter_issue_low_level_thread_lock.diff	osantana, 2017-05-24 22:37	(use this) use <code>_thread.allocate_lock()</code> as lock provider	
fix_os_environ_iter_issue_threading_lock.diff	osantana, 2017-05-24 22:46		
fix_os_environ_iter_issue_low_level_thread_lock_2.diff	osantana, 2017-05-25 17:08		
- Pull Requests**:

URL	Status	Linked	Edit
PR 2409	merged	osantana, 2017-06-26 14:32	
PR 2556	merged	serhiy.storchaka, 2017-07-04 04:22	
PR 2557	merged	serhiy.storchaka, 2017-07-04 04:24	
- Messages (27)**:
 - msg294250 - (view)** | **Author:** Osvaldo Santana Neto (osantana) * | **Date:** 2017-05-23 14:35
 - We're facing occasional `RuntimeError` exceptions in a multithreaded application when one of the threads creates new entries to the environment (`os.environ`).
 - I'm not so sure if the attached patch fixes this issue the right way, so, feel free to propose another approach.

<https://bugs.python.org/issue30441>

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Tentativa #2

```
1 diff --git a/Lib/os.py b/Lib/os.py
2 index e293ecae7f..4dfa41c712 100644
3 --- a/Lib/os.py
4 +++ b/Lib/os.py
5 @@ -25,6 +25,7 @@ and opendir), and leave all pathname manipulation to os.path
6     import abc
7     import sys, errno
8     import stat as st
9     +import _thread
10
11     _names = sys.builtin_module_names
12
13 @@ -672,6 +673,7 @@ class _Environ(MutableMapping):
14         self.putenv = putenv
15         self.unsetenv = unsetenv
16         self._data = data
17     + self._lock = _thread.allocate_lock()
18
19     def __getitem__(self, key):
20         try:
21 @@ -697,7 +699,9 @@ class _Environ(MutableMapping):
22             raise KeyError(key) from None
23
24     def __iter__(self):
25     -     for key in self._data:
26     +     with self._lock:
27     +         keys = list(self._data)
28     +         for key in keys:
29                 yield self.decodekey(key)
30
31     def __len__(self):
```

Solução Final

```
4 ■■■■ Lib/os.py View  
```

⚡		@@ -697,7 +697,9 @@ def __delitem__(self, key):
697	697	raise KeyError(key) from None
698	698	
699	699	def __iter__(self):
700	-	for key in self._data:
	700	# list() from dict object is an atomic operation
	701	keys = list(self._data)
	702	for key in keys:
701	703	yield self.decodekey(key)
702	704	
703	705	def __len__(self):
⚡		

Github Pull Request

The screenshot shows a GitHub Pull Request page for the repository `python/cpython`. The pull request is titled `bpo-30441: Fix bug when modifying os.environ while iterating over it #2409` and is marked as **Merged**. It was merged by `serhiy-storchaka` on July 1, 2017. The pull request includes 7 commits, 4 files changed, and 13 conversations. A comment from `osantana` on June 26, 2017, asks: "Opening this pull request at Serhiy Storchaka's request to correct Bug #30441. Question: Would not it be better to use tuple() instead of list() at Lib/os.py:700?". The pull request is reviewed by `serhiy-storchaka` on June 27, 2017. The pull request has labels `CLA signed` and `type-bugfix`. The right sidebar shows the reviewer `serhiy-storchaka` with a green checkmark, and the assignees section is empty. The labels section shows `CLA signed` and `type-bugfix`. The projects section is empty. The milestone section is empty. The notifications section is empty.

<https://github.com/python/cpython/pull/2409>

A Recompensa?

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**Ter um Python
ainda melhor**

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E entrar pra história! 😊

python / cpython

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Branch: master cpython / Misc / ACKS Find file Copy path

jreese bpo-33504: Migrate config from OrderedDict to dict. (#6819) 3a5b0d8 5 days ago

173 contributors and others

1825 lines (1820 sloc) | 26.2 KB Raw Blame History

```
1 Acknowledgements
2 -----
3
4 This list is not complete and not in any useful order, but I would
5 like to thank everybody who contributed in any way, with code, hints,
6 bug reports, ideas, moral support, endorsement, or even complaints....
7 Without you, I would've stopped working on Python long ago!
8
9 --Guido
10
11 PS: In the standard Python distribution, this file is encoded in UTF-8
12 and the list is in rough alphabetical order by last names.
13
14 Aahz
15 Michael Abbott
...
1126
1127 Tony Nelson
1128 Trent Nelson
1129 Andrew Nester
... 1130 Osvaldo Santana Neto
1131 Chad Netzer
1132 Max Neunhöffer
1133 Anthon van der Neut
1134 George Neville-Neil
```

<https://github.com/python/cpython/blob/master/Misc/ACKS#L1130>

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