# :mod:`resource` --- Resource usage information

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library] resource.rst, line 1); backlink

Unknown interpreted text role "mod".

 $System\,Message: ERROR/3~(\texttt{D:}\conboarding-resources}\conboarding-resources\\conboardin$ 

Unknown directive type "module".

```
.. module:: resource :platform: Unix :synopsis: An interface to provide resource usage information on the current process.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]resource.rst, line 8)

Unknown directive type "moduleauthor".

.. moduleauthor:: Jeremy Hylton <jeremy@alum.mit.edu>

 $System\,Message:\,ERROR/3\,(\mbox{D:\noboarding-resources}\xsple-onboarding-resources\xsple-onboarding-$ 

Unknown directive type "sectionauthor".

.. sectionauthor:: Jeremy Hylton <jeremy@alum.mit.edu>

This module provides basic mechanisms for measuring and controlling system resources utilized by a program.

Symbolic constants are used to specify particular system resources and to request usage information about either the current process or its children.

An :exc: 'OSError' is raised on syscall failure.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]resource.rst, line 19); backlink

Unknown interpreted text role "exc".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]resource.rst, line 22)

Unknown directive type "exception".

```
.. exception:: error
A deprecated alias of :exc:`OSError`.
.. versionchanged:: 3.3
    Following :pep:`3151`, this class was made an alias of :exc:`OSError`.
```

#### **Resource Limits**

Resources usage can be limited using the :func:`setrlimit` function described below. Each resource is controlled by a pair of limits: a soft limit and a hard limit. The soft limit is the current limit, and may be lowered or raised by a process over time. The soft limit can never exceed the hard limit. The hard limit can be lowered to any value greater than the soft limit, but not raised. (Only processes with the effective UID of the super-user can raise a hard limit.)

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]resource.rst, line 33); backlink

Unknown interpreted text role "func".

The specific resources that can be limited are system dependent. They are described in the :manpage: 'getrlimit(2)' man page. The resources listed below are supported when the underlying operating system supports them; resources which cannot be checked or controlled by the operating system are not defined in this module for those platforms.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library] resource.rst, line 41); backlink

Unknown interpreted text role "manpage".

 $System\,Message: ERROR/3~(\texttt{D:}\conboarding-resources}\copython-main\coc\library\copython-main\coc\library\copython-main\coc\copython-mai$ 

Unknown directive type "data".

.. data:: RLIM\_INFINITY

Constant used to represent the limit for an unlimited resource.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library] resource.rst, line 53)

Unknown directive type "function".

.. function:: getrlimit(resource)

Returns a tuple ``(soft, hard)`` with the current soft and hard limits of \*resource\*. Raises :exc:`ValueError` if an invalid resource is specified, or :exc:`error` if the underlying system call fails unexpectedly.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]resource.rst, line 60)

Unknown directive type "function".

.. function:: setrlimit(resource, limits)

Sets new limits of consumption of \*resource\*. The \*limits\* argument must be a tuple ``(soft, hard)`` of two integers describing the new limits. A value of :data:`~resource.RLIM\_INFINITY` can be used to request a limit that is unlimited.

Raises :exc:`ValueError` if an invalid resource is specified, if the new soft limit exceeds the hard limit, or if a process tries to raise its hard limit. Specifying a limit of :data:`~resource.RLIM\_INFINITY` when the hard or system limit for that resource is not unlimited will result in a :exc:`ValueError`. A process with the effective UID of super-user can request any valid limit value, including unlimited, but :exc:`ValueError` will still be raised if the requested limit exceeds the system imposed limit.

``setrlimit`` may also raise :exc:`error` if the underlying system call fails.

 $\label{lem:vxWorks} \mbox{VxWorks only supports setting :} \mbox{data:`RLIMIT\_NOFILE`.}$ 

 $\dots$  audit-event:: resource.setrlimit resource, limits resource.setrlimit

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library] resource.rst, line 84)

Unknown directive type "function".

.. function:: prlimit(pid, resource[, limits])

Combines :func:`setrlimit` and :func:`getrlimit` in one function and supports to get and set the resources limits of an arbitrary process. If \*pid\* is 0, then the call applies to the current process. \*resource\* and

```
*limits* have the same meaning as in :func:`setrlimit`, except that
*limits* is optional.

When *limits* is not given the function returns the *resource* limit of the
process *pid*. When *limits* is given the *resource* limit of the process is
set and the former resource limit is returned.

Raises :exc:`ProcessLookupError` when *pid* can't be found and
:exc:`PermissionError` when the user doesn't have ``CAP_SYS_RESOURCE`` for
the process.

.. audit-event:: resource.prlimit pid,resource,limits resource.prlimit
.. availability:: Linux 2.6.36 or later with glibc 2.13 or later.

.. versionadded:: 3.4
```

These symbols define resources whose consumption can be controlled using the :func:'setrlimit' and :func:'getrlimit' functions described below. The values of these symbols are exactly the constants used by C programs.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library] resource.rst, line 107); backlink

Unknown interpreted text role "func".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library] resource.rst, line 107); backlink

Unknown interpreted text role "func".

The Unix man page for <a href="manpage">manpage</a> getrlimit(2)` lists the available resources. Note that not all systems use the same symbol or same value to denote the same resource. This module does not attempt to mask platform differences --- symbols not defined for a platform will not be available from this module on that platform.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library] resource.rst, line 111); backlink

Unknown interpreted text role "manpage".

 $System\,Message: ERROR/3~(\texttt{D:}\conboarding-resources}\conboarding-resources\\conboardin$ 

Unknown directive type "data".

.. data:: RLIMIT CORE

The maximum size (in bytes) of a core file that the current process can create. This may result in the creation of a partial core file if a larger core would be required to contain the entire process image.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library] resource.rst, line 125)

Unknown directive type "data".

.. data:: RLIMIT\_CPU

The maximum amount of processor time (in seconds) that a process can use. If this limit is exceeded, a :const:`SIGXCPU` signal is sent to the process. (See the :mod:`signal` module documentation for information about how to catch this signal and do something useful, e.g. flush open files to disk.)

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library] resource.rst, line 133)

Unknown directive type "data".

.. data:: RLIMIT\_FSIZE

The maximum size of a file which the process may create.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library] resource.rst, line 138)

Unknown directive type "data".

.. data:: RLIMIT\_DATA

The maximum size (in bytes) of the process's heap.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library] resource.rst, line 143)

Unknown directive type "data".

.. data:: RLIMIT\_STACK

The maximum size (in bytes) of the call stack for the current process. This only affects the stack of the main thread in a multi-threaded process.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library] resource.rst, line 149)

Unknown directive type "data".

.. data:: RLIMIT\_RSS

The maximum resident set size that should be made available to the process.

 $System\,Message: ERROR/3~(\texttt{D:}\conboarding-resources}\conboarding-resources\\conboardin$ 

Unknown directive type "data".

.. data:: RLIMIT\_NPROC

The maximum number of processes the current process may create.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]resource.rst, line 159)

Unknown directive type "data".

.. data:: RLIMIT\_NOFILE

The maximum number of open file descriptors for the current process.

 $System\,Message: ERROR/3~(\texttt{D:}\onboarding-resources}\cpython-main\Doc\library\[cpython-main\][Doc]~[library\]resource.rst, \ \ line~164)$ 

Unknown directive type "data".

.. data:: RLIMIT\_OFILE
The BSD name for :const:`RLIMIT NOFILE`.

```
main\Doc\library\[cpython-main][Doc][library]resource.rst, line 169)
Unknown directive type "data".
   .. data:: RLIMIT_MEMLOCK
      The maximum address space which may be locked in memory.
System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-
main\Doc\library\[cpython-main][Doc][library]resource.rst, line 174)
Unknown directive type "data".
   .. data:: RLIMIT VMEM
      The largest area of mapped memory which the process may occupy.
System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-
main\Doc\library\[cpython-main][Doc][library]resource.rst, line 179)
Unknown directive type "data".
   .. data:: RLIMIT_AS
      The maximum area (in bytes) of address space which may be taken by the process.
System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-
main\Doc\library\[cpython-main][Doc][library]resource.rst, line 184)
Unknown directive type "data".
   .. data:: RLIMIT MSGQUEUE
      The number of bytes that can be allocated for POSIX message queues.
      .. availability:: Linux 2.6.8 or later.
      .. versionadded:: 3.4
System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-
main\Doc\library\[cpython-main][Doc][library]resource.rst, line 193)
Unknown directive type "data".
   .. data:: RLIMIT NICE
      The ceiling for the process's nice level (calculated as 20 - rlim cur).
      .. availability:: Linux 2.6.12 or later.
      .. versionadded:: 3.4
main\Doc\library\[cpython-main][Doc][library]resource.rst, line 202)
Unknown directive type "data".
   .. data:: RLIMIT RTPRIO
      The ceiling of the real-time priority.
      .. availability:: Linux 2.6.12 or later.
```

.. versionadded:: 3.4

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpythonmain\Doc\library\[cpython-main] [Doc] [library] resource.rst, line 211) Unknown directive type "data". .. data:: RLIMIT RTTIME The time limit (in microseconds) on CPU time that a process can spend under real-time scheduling without making a blocking syscall. .. availability:: Linux 2.6.25 or later. .. versionadded:: 3.4 System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpythonmain\Doc\library\[cpython-main] [Doc] [library] resource.rst, line 221) Unknown directive type "data". .. data:: RLIMIT SIGPENDING The number of signals which the process may queue. .. availability:: Linux 2.6.8 or later. .. versionadded:: 3.4 main\Doc\library\[cpython-main] [Doc] [library] resource.rst, line 229) Unknown directive type "data". .. data:: RLIMIT SBSIZE The maximum size (in bytes) of socket buffer usage for this user. This limits the amount of network memory, and hence the amount of mbufs, that this user may hold at any time. .. availability:: FreeBSD 9 or later. .. versionadded:: 3.4 System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpythonmain\Doc\library\[cpython-main][Doc][library]resource.rst, line 239) Unknown directive type "data". .. data:: RLIMIT SWAP The maximum size (in bytes) of the swap space that may be reserved or used by all of this user id's processes. This limit is enforced only if bit 1 of the vm.overcommit sysctl is set. Please see `tuning(7) <https://www.freebsd.org/cgi/man.cgi?query=tuning&sektion=7>` for a complete description of this sysctl. .. availability:: FreeBSD 9 or later. .. versionadded:: 3.4  $System\,Message:\,ERROR/3\,(\texttt{D:}\label{locality}) and the proposition of the proposition$ main\Doc\library\[cpython-main][Doc][library]resource.rst, line 252) Unknown directive type "data". .. data:: RLIMIT NPTS The maximum number of pseudo-terminals created by this user id.

.. availability:: FreeBSD 9 or later.

.. versionadded:: 3.4

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library] resource.rst, line 260)

Unknown directive type "data".

```
.. data:: RLIMIT_KQUEUES
    The maximum number of kqueues this user id is allowed to create.
    .. availability:: FreeBSD 11 or later.
    .. versionadded:: 3.10
```

## Resource Usage

These functions are used to retrieve resource usage information:

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]resource.rst, line 274)

Unknown directive type "function".

.. function:: getrusage(who)

This function returns an object that describes the resources consumed by either the current process or its children, as specified by the \*who\* parameter. The \*who\* parameter should be specified using one of the :const:`RUSAGE\_\\*` constants described below.

A simple example::

```
from resource import *
import time

# a non CPU-bound task
time.sleep(3)
print(getrusage(RUSAGE_SELF))

# a CPU-bound task
for i in range(10 ** 8):
    _ = 1 + 1
print(getrusage(RUSAGE_SELF))
```

The fields of the return value each describe how a particular system resource has been used, e.g. amount of time spent running is user mode or number of times the process was swapped out of main memory. Some values are dependent on the clock tick internal, e.g. the amount of memory the process is using.

For backward compatibility, the return value is also accessible as a tuple of 16 elements.

The fields :attr:`ru\_utime` and :attr:`ru\_stime` of the return value are floating point values representing the amount of time spent executing in user mode and the amount of time spent executing in system mode, respectively. The remaining values are integers. Consult the :manpage:`getrusage(2)` man page for detailed information about these values. A brief summary is presented here:

		L
Index	Field	Resource
``0``	:attr:`ru_utime`	time in user mode (float seconds)
``1``	:attr:`ru_stime`	time in system mode (float seconds)
``2``	:attr:`ru_maxrss`	maximum resident set size
``3``	:attr:`ru_ixrss`	shared memory size
``4``	:attr:`ru_idrss`	unshared memory size
``5``	:attr:`ru_isrss`	unshared stack size
``6``	:attr:`ru_minflt`	page faults not requiring I/O
``7``	:attr:`ru majflt`	page faults requiring I/O

This function will raise a :exc:`ValueError` if an invalid \*who\* parameter is specified. It may also raise :exc:`error` exception in unusual circumstances.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library] resource.rst, line 349)

Unknown directive type "function".

.. function:: getpagesize()

Returns the number of bytes in a system page. (This need not be the same as the hardware page size.)

The following :const: `RUSAGE\_\\*` symbols are passed to the :func: `getrusage` function to specify which processes information should be provided for.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library] resource.rst, line 354); backlink

Unknown interpreted text role "const".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library] resource.rst, line 354); backlink

Unknown interpreted text role "func".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library] resource.rst, line 358)

Unknown directive type "data".

.. data:: RUSAGE SELF

Pass to :func:`getrusage` to request resources consumed by the calling process, which is the sum of resources used by all threads in the process.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library] resource.rst, line 364)

Unknown directive type "data".

.. data:: RUSAGE CHILDREN

Pass to :func:`getrusage` to request resources consumed by child processes of the calling process which have been terminated and waited for.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main][Doc][library]resource.rst, line 370)

## Unknown directive type "data".

.. data:: RUSAGE BOTH

Pass to :func: getrusage to request resources consumed by both the current process and child processes. May not be available on all systems.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library] resource.rst, line 376)

## Unknown directive type "data".

.. data:: RUSAGE\_THREAD

Pass to :func: getrusage to request resources consumed by the current thread. May not be available on all systems.

.. versionadded:: 3.2