Rocky Enterprise Linux 9.2 Manual Pages on command 'posix_memalign.3'

$ man posix_memalign.3

POSIX_MEMALIGN(3)   Linux Programmer's Manual   POSIX_MEMALIGN(3)

NAME

   posix_memalign, aligned_alloc, memalign, valloc, pvalloc - allocate aligned memory

SYNOPSIS

   #include <stdlib.h>

   int posix_memalign(void **memptr, size_t alignment, size_t size);

   void *aligned_alloc(size_t alignment, size_t size);

   void *valloc(size_t size);

   #include <malloc.h>

   void *memalign(size_t alignment, size_t size);

   void *pvalloc(size_t size);

 Feature Test Macro Requirements for glibc (see feature_test_macros(7)):

   posix_memalign(): _POSIX_C_SOURCE >= 200112L

   aligned_alloc(): _ISOC11_SOURCE

   valloc():

     Since glibc 2.12:

       (_XOPEN_SOURCE >= 500) && !(_POSIX_C_SOURCE >= 200112L)

         || /* Glibc since 2.19: */ _DEFAULT_SOURCE

         || /* Glibc versions <= 2.19: */ _SVID_SOURCE || _BSD_SOURCE

     Before glibc 2.12:

       _BSD_SOURCE || _XOPEN_SOURCE >= 500

       (The (nonstandard) header file <malloc.h> also exposes the declaration of val?

       loc(); no feature test macros are required.)

DESCRIPTION

The function posix_memalign() allocates size bytes and places the address of the allocated memory in *memptr. The address of the allocated memory will be a multiple of alignment, which must be a power of two and a multiple of sizeof(void *). This address can later be successfully passed to free(3). If size is 0, then the value placed in *memptr is either NULL or a unique pointer value.

The obsolete function memalign() allocates size bytes and returns a pointer to the allo‐ cated memory. The memory address will be a multiple of alignment, which must be a power of two.

The function aligned_alloc() is the same as memalign(), except for the added restriction that size should be a multiple of alignment.

The obsolete function valloc() allocates size bytes and returns a pointer to the allocated memory. The memory address will be a multiple of the page size. It is equivalent to memalign(sysconf(_SC_PAGESIZE),size).

The obsolete function pvalloc() is similar to valloc(), but rounds the size of the alloca‐ tion up to the next multiple of the system page size.

For all of these functions, the memory is not zeroed.

RETURN VALUE

aligned_alloc(), memalign(), valloc(), and pvalloc() return a pointer to the allocated memory on success. On error, NULL is returned, and errno is set to indicate the cause of the error.

posix_memalign() returns zero on success, or one of the error values listed in the next section on failure. The value of errno is not set. On Linux (and other systems), posix_memalign() does not modify memptr on failure. A requirement standardizing this be‐ havior was added in POSIX.1-2008 TC2.

ERRORS

EINVAL The alignment argument was not a power of two, or was not a multiple of sizeof(void *).

ENOMEM There was insufficient memory to fulfill the allocation request.

VERSIONS

The functions memalign(), valloc(), and pvalloc() have been available since at least glibc 2.0.

The function aligned_alloc() was added to glibc in version 2.16.

The function posix_memalign() is available since glibc 2.1.91.

ATTRIBUTES

For an explanation of the terms used in this section, see attributes(7).

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?????????????????????????????????????????????????????????
?Interface        ? Attribute    ? Value         ?
?????????????????????????????????????????????????????????
?aligned_alloc(), ? Thread safety ? MT-Safe       ?
?memalign(),      ?              ?              ?
?posix_memalign() ?              ?              ?
?????????????????????????????????????????????????????????
?valloc(),        ? Thread safety ? MT-Unsafe init ?
?pvalloc()        ?              ?              ?
?????????????????????????????????????????????????????????
```

CONFORMING TO

The function valloc() appeared in 3.0BSD. It is documented as being obsolete in 4.3BSD,
and as legacy in SUSv2. It does not appear in POSIX.1.

The function pvalloc() is a GNU extension.

The function memalign() appears in SunOS 4.1.3 but not in 4.4BSD.

The function posix_memalign() comes from POSIX.1d and is specified in POSIX.1-2001 and
POSIX.1-2008.

The function aligned_alloc() is specified in the C11 standard.

Headers

Everybody agrees that posix_memalign() is declared in <stdlib.h>.

On some systems memalign() is declared in <stdlib.h> instead of <malloc.h>.

According to SUSv2, valloc() is declared in <stdlib.h>. Glibc declares it in <malloc.h>,
and also in <stdlib.h> if suitable feature test macros are defined (see above).

NOTES

On many systems there are alignment restrictions, for example, on buffers used for direct
block device I/O. POSIX specifies the pathconf(path,_PC_REC_XFER_ALIGN) call that tells
what alignment is needed. Now one can use posix_memalign() to satisfy this requirement.

posix_memalign() verifies that alignment matches the requirements detailed above.   mema?
lign() may not check that the alignment argument is correct.

POSIX requires that memory obtained from posix_memalign() can be freed using free(3).

Some systems provide no way to reclaim memory allocated with memalign() or valloc() (be‐
cause one can pass to free(3) only a pointer obtained from malloc(3), while, for example,
memalign() would call malloc(3) and then align the obtained value). The glibc implementa‐
tion allows memory obtained from any of these functions to be reclaimed with free(3).

The glibc malloc(3) always returns 8-byte aligned memory addresses, so these functions are
needed only if you require larger alignment values.

SEE ALSO

brk(2), getpagesize(2), free(3), malloc(3)

COLOPHON

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project, information about reporting bugs, and the latest version of this page, can be
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