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### ***Rocky Enterprise Linux 9.2 Manual Pages on command 'spu\_create.2'***

**\$ man spu\_create.2**

SPU\_CREATE(2)                      Linux Programmer's Manual                      SPU\_CREATE(2)

#### NAME

spu\_create - create a new spu context

#### SYNOPSIS

```
#include <sys/types.h>
#include <sys/spu.h>

int spu_create(const char *pathname, int flags, mode_t mode,
               int neighbor_fd);
```

Note: There is no glibc wrapper for this system call; see NOTES.

#### DESCRIPTION

The spu\_create() system call is used on PowerPC machines that implement the Cell Broadband Engine Architecture in order to access Synergistic Processor Units (SPUs). It creates a new logical context for an SPU in pathname and returns a file descriptor associated with it. pathname must refer to a nonexistent directory in the mount point of the SPU filesystem (spufs). If spu\_create() is successful, a directory is created at pathname and it is populated with the files described in spufs(7).

When a context is created, the returned file descriptor can only be passed to spu\_run(2), used as the dirfd argument to the \*at family of system calls (e.g., openat(2)), or closed; other operations are not defined. A logical SPU context is destroyed (along with all files created within the context's pathname directory) once the last reference to the context has gone; this usually occurs when the file descriptor returned by spu\_create() is closed.

The mode argument (minus any bits set in the process's umask(2)) specifies the permissions

used for creating the new directory in spufs. See stat(2) for a full list of the possible mode values.

The neighbor\_fd is used only when the SPU\_CREATE\_AFFINITY\_SPU flag is specified; see below.

The flags argument can be zero or any bitwise OR-ed combination of the following constants:

#### SPU\_CREATE\_EVENTS\_ENABLED

Rather than using signals for reporting DMA errors, use the event argument to spu\_run(2).

#### SPU\_CREATE\_GANG

Create an SPU gang instead of a context. (A gang is a group of SPU contexts that are functionally related to each other and which share common scheduling parameters: priority and policy. In the future, gang scheduling may be implemented causing the group to be switched in and out as a single unit.)

A new directory will be created at the location specified by the pathname argument.

This gang may be used to hold other SPU contexts, by providing a pathname that is within the gang directory to further calls to spu\_create().

#### SPU\_CREATE\_NOSCHED

Create a context that is not affected by the SPU scheduler. Once the context is run, it will not be scheduled out until it is destroyed by the creating process.

Because the context cannot be removed from the SPU, some functionality is disabled for SPU\_CREATE\_NOSCHED contexts. Only a subset of the files will be available in this context directory in spufs. Additionally, SPU\_CREATE\_NOSCHED contexts cannot dump a core file when crashing.

Creating SPU\_CREATE\_NOSCHED contexts requires the CAP\_SYS\_NICE capability.

#### SPU\_CREATE\_ISOLATE

Create an isolated SPU context. Isolated contexts are protected from some PPE (PowerPC Processing Element) operations, such as access to the SPU local store and the NPC register.

Creating SPU\_CREATE\_ISOLATE contexts also requires the SPU\_CREATE\_NOSCHED flag.

#### SPU\_CREATE\_AFFINITY\_SPU (since Linux 2.6.23)

Create a context with affinity to another SPU context. This affinity information is used within the SPU scheduling algorithm. Using this flag requires that a file

descriptor referring to the other SPU context be passed in the neighbor\_fd argument.

#### SPU\_CREATE\_AFFINITY\_MEM (since Linux 2.6.23)

Create a context with affinity to system memory. This affinity information is used within the SPU scheduling algorithm.

#### RETURN VALUE

On success, spu\_create() returns a new file descriptor. On error, -1 is returned, and errno is set to one of the error codes listed below.

#### ERRORS

**EACCES** The current user does not have write access to the spufs(7) mount point.

**EEXIST** An SPU context already exists at the given pathname.

**EFAULT** pathname is not a valid string pointer in the calling process's address space.

**EINVAL** pathname is not a directory in the spufs(7) mount point, or invalid flags have been provided.

**ELOOP** Too many symbolic links were found while resolving pathname.

**EMFILE** The per-process limit on the number of open file descriptors has been reached.

#### **ENAMETOOLONG**

pathname is too long.

**ENFILE** The system-wide limit on the total number of open files has been reached.

**ENODEV** An isolated context was requested, but the hardware does not support SPU isolation.

**ENOENT** Part of pathname could not be resolved.

**ENOMEM** The kernel could not allocate all resources required.

**ENOSPC** There are not enough SPU resources available to create a new context or the user-specific limit for the number of SPU contexts has been reached.

**ENOSYS** The functionality is not provided by the current system, because either the hardware does not provide SPUs or the spufs module is not loaded.

#### **ENOTDIR**

A part of pathname is not a directory.

**EPERM** The SPU\_CREATE\_NOSCHED flag has been given, but the user does not have the CAP\_SYS\_NICE capability.

#### FILES

pathname must point to a location beneath the mount point of spufs. By convention, it gets mounted in /spu.

## VERSIONS

The `spu_create()` system call was added to Linux in kernel 2.6.16.

## CONFORMING TO

This call is Linux-specific and implemented only on the PowerPC architecture. Programs using this system call are not portable.

## NOTES

Glibc does not provide a wrapper for this system call; call it using `syscall(2)`. Note however, that `spu_create()` is meant to be used from libraries that implement a more abstract interface to SPUs, not to be used from regular applications. See <http://www.bsc.es/projects/deepcomputing/linuxoncell/> for the recommended libraries. Prior to the addition of the `SPU_CREATE_AFFINITY_SPU` flag in Linux 2.6.23, the `spu_create()` system call took only three arguments (i.e., there was no `neighbor_fd` argument).

## EXAMPLES

See `spu_run(2)` for an example of the use of `spu_create()`

## SEE ALSO

`close(2)`, `spu_run(2)`, `capabilities(7)`, `spufs(7)`

## COLOPHON

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