

NAME

condvar, **cv_init**, **cv_destroy**, **cv_wait**, **cv_wait_sig**, **cv_wait_unlock**, **cv_timedwait**, **cv_timedwait_sbt**, **cv_timedwait_sig**, **cv_timedwait_sig_sbt**, **cv_signal**, **cv_broadcast**, **cv_broadcastpri**, **cv_wmesg** - kernel condition variable

SYNOPSIS

```
#include <sys/param.h>
```

```
#include <sys/proc.h>
```

```
#include <sys/condvar.h>
```

void

```
cv_init(struct cv *cvp, const char *desc);
```

void

```
cv_destroy(struct cv *cvp);
```

void

```
cv_wait(struct cv *cvp, lock);
```

int

```
cv_wait_sig(struct cv *cvp, lock);
```

void

```
cv_wait_unlock(struct cv *cvp, lock);
```

int

```
cv_timedwait(struct cv *cvp, lock, int timo);
```

int

```
cv_timedwait_sbt(struct cv *cvp, lock, sbintime_t sbt, sbintime_t pr, int flags);
```

int

```
cv_timedwait_sig(struct cv *cvp, lock, int timo);
```

int

```
cv_timedwait_sig_sbt(struct cv *cvp, lock, sbintime_t sbt, sbintime_t pr, int flags);
```

void

```
cv_signal(struct cv *cvp);
```

```
void
cv_broadcast(struct cv *cvp);
```

```
void
cv_broadcastpri(struct cv *cvp, int pri);
```

```
const char *
cv_wmesg(struct cv *cvp);
```

DESCRIPTION

Condition variables are used in conjunction with mutexes to wait for conditions to occur. Condition variables are created with **cv_init**(), where *cvp* is a pointer to space for a *struct cv*, and *desc* is a pointer to a null-terminated character string that describes the condition variable. Condition variables are destroyed with **cv_destroy**(). Threads wait on condition variables by calling **cv_wait**(), **cv_wait_sig**(), **cv_wait_unlock**(), **cv_timedwait**(), or **cv_timedwait_sig**(). Threads unblock waiters by calling **cv_signal**() to unblock one waiter, or **cv_broadcast**() or **cv_broadcastpri**() to unblock all waiters. In addition to waking waiters, **cv_broadcastpri**() ensures that all of the waiters have a priority of at least *pri* by raising the priority of any threads that do not. **cv_wmesg**() returns the description string of *cvp*, as set by the initial call to **cv_init**().

The *lock* argument is a pointer to either a mutex(9), rwlock(9), or sx(9) lock. A mutex(9) argument must be initialized with MTX_DEF and not MTX_SPIN. A thread must hold *lock* before calling **cv_wait**(), **cv_wait_sig**(), **cv_wait_unlock**(), **cv_timedwait**(), or **cv_timedwait_sig**(). When a thread waits on a condition, *lock* is atomically released before the thread is blocked, then reacquired before the function call returns. In addition, the thread will fully drop the *Giant* mutex (even if recursed) while the it is suspended and will reacquire the *Giant* mutex before the function returns. The **cv_wait_unlock**() function does not reacquire the lock before returning. Note that the *Giant* mutex may be specified as *lock*. However, *Giant* may not be used as *lock* for the **cv_wait_unlock**() function. All waiters must pass the same *lock* in conjunction with *cvp*.

When **cv_wait**(), **cv_wait_sig**(), **cv_wait_unlock**(), **cv_timedwait**(), and **cv_timedwait_sig**() unblock, their calling threads are made runnable. **cv_timedwait**() and **cv_timedwait_sig**() wait for at most *timo* / HZ seconds before being unblocked and returning EWOULDBLOCK; otherwise, they return 0. **cv_wait_sig**() and **cv_timedwait_sig**() return prematurely with a value of EINTR or ERESTART if a signal is caught, or 0 if signaled via **cv_signal**() or **cv_broadcast**().

cv_timedwait_sbt() and **cv_timedwait_sig_sbt**() functions take *sbt* argument instead of *timo*. It allows to specify relative or absolute unblock time with higher resolution in form of *sbintime_t*. The parameter *pr* allows to specify wanted absolute event precision. The parameter *flags* allows to pass additional **callout_reset_sbt**() flags.

RETURN VALUES

If successful, `cv_wait_sig()`, `cv_timedwait()`, and `cv_timedwait_sig()` return 0. Otherwise, a non-zero error code is returned.

`cv_wmesg()` returns the description string that was passed to `cv_init()`.

ERRORS

`cv_wait_sig()` and `cv_timedwait_sig()` will fail if:

[EINTR] A signal was caught and the system call should be interrupted.

[ERESTART] A signal was caught and the system call should be restarted.

`cv_timedwait()` and `cv_timedwait_sig()` will fail if:

[EWOULDBLOCK] Timeout expired.

SEE ALSO

`callout(9)`, `locking(9)`, `mtx_pool(9)`, `mutex(9)`, `rwlock(9)`, `sema(9)`, `sleep(9)`, `sx(9)`