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);

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void
cv_broadcast(struct cv *cvp);
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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)