### **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)