Threading and synchronization utilities

libuv provides cross-platform implementations for multiple threading and synchronization primitives. The API largely follows the pthreads API.

Data types

```
.. c:type:: uv_thread_t

    Thread data type.
```

```
.. c:type:: void (*uv_thread_cb)(void* arg)

    Callback that is invoked to initialize thread execution. `arg` is the same
    value that was passed to :c:func:`uv_thread_create`.
```

```
.. c:type:: uv_key_t

    Thread-local key data type.
```

```
.. c:type:: uv_once_t

    Once-only initializer data type.
```

```
.. c:type:: uv_mutex_t

    Mutex data type.
```

```
.. c:type:: uv_rwlock_t

    Read-write lock data type.
```

```
.. c:type:: uv_sem_t

    Semaphore data type.
```

```
.. c:type:: uv_cond_t

    Condition data type.
```

```
.. c:type:: uv_barrier_t

    Barrier data type.
```

API

Threads

```
.. c:type:: uv_thread_options_t

    Options for spawning a new thread (passed to :c:func:`uv_thread_create_ex`).

    ::

        typedef struct uv_thread_options_s {
          enum {
            UV_THREAD_NO_FLAGS = 0x00,
            UV_THREAD_HAS_STACK_SIZE = 0x01
          } flags;
          size_t stack_size;
        } uv_thread_options_t;

    More fields may be added to this struct at any time, so its exact
    layout and size should not be relied upon.

    .. versionadded:: 1.26.0
```

```
.. c:function:: int uv_thread_create(uv_thread_t* tid, uv_thread_cb entry, void* arg)

    .. versionchanged:: 1.4.1 returns a UV_E* error code on failure
```

```
.. c:function:: int uv_thread_create_ex(uv_thread_t* tid, const uv_thread_options_t* params, uv_thread_cb entr

    Like :c:func:`uv_thread_create`, but additionally specifies options for creating a new thread.

    If `UV_THREAD_HAS_STACK_SIZE` is set, `stack_size` specifies a stack size for the new thread.
    `0` indicates that the default value should be used, i.e. behaves as if the flag was not set.
    Other values will be rounded up to the nearest page boundary.

    .. versionadded:: 1.26.0
```

```
.. c:function:: uv_thread_t uv_thread_self(void)
```

```
.. c:function:: int uv_thread_join(uv_thread_t *tid)
```

```
.. c:function:: int uv_thread_equal(const uv_thread_t* t1, const uv_thread_t* t2)
```

Thread-local storage

Note

The total thread-local storage size may be limited. That is, it may not be possible to create many TLS keys.

Once-only initialization

Runs a function once and only once. Concurrent calls to :c:func:`uv_once` with the same guard will block all callers except one (it's unspecified which one). The guard should be initialized statically with the UV_ONCE_INIT macro.

Mutex locks

Functions return 0 on success or an error code < 0 (unless the return type is void, of course).

Read-write locks

Functions return 0 on success or an error code < 0 (unless the return type is void, of course).

Semaphores

Functions return 0 on success or an error code < 0 (unless the return type is void, of course).

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\node-master\deps\uv\docs\src\[node-master][deps][uv][docs][src]threading.rst`**, line 150)**

Unknown directive type "c:function".

```
.. c:function:: int uv_sem_init(uv_sem_t* sem, unsigned int value)
```

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\node-master\deps\uv\docs\src\[node-master][deps][uv][docs][src]threading.rst`**, line 151)**

Unknown directive type "c:function".

```
.. c:function:: void uv_sem_destroy(uv_sem_t* sem)
```

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\node-master\deps\uv\docs\src\[node-master][deps][uv][docs][src]threading.rst`**, line 152)**

Unknown directive type "c:function".

```
.. c:function:: void uv_sem_post(uv_sem_t* sem)
```

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\node-master\deps\uv\docs\src\[node-master][deps][uv][docs][src]threading.rst`**, line 153)**

Unknown directive type "c:function".

```
.. c:function:: void uv_sem_wait(uv_sem_t* sem)
```

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\node-master\deps\uv\docs\src\[node-master][deps][uv][docs][src]threading.rst`**, line 154)**

Unknown directive type "c:function".

```
.. c:function:: int uv_sem_trywait(uv_sem_t* sem)
```

Conditions

Functions return 0 on success or an error code < 0 (unless the return type is void, of course).

> **Note**
> 1. Callers should be prepared to deal with spurious wakeups on :c:func:`uv_cond_wait` and :c:func:`uv_cond_timedwait`.
>
>> **System Message: ERROR/3 (**`D:\onboarding-resources\sample-onboarding-resources\node-master\deps\uv\docs\src\[node-master][deps][uv][docs][src]threading.rst`**, line 163); *backlink***
>> Unknown interpreted text role "c:func".
>
>> **System Message: ERROR/3 (**`D:\onboarding-resources\sample-onboarding-resources\node-master\deps\uv\docs\src\[node-master][deps][uv][docs][src]threading.rst`**, line 163); *backlink***
>> Unknown interpreted text role "c:func".
>
> 2. The timeout parameter for :c:func:`uv_cond_timedwait` is relative to the time at which function is called.
>
>> **System Message: ERROR/3 (**`D:\onboarding-resources\sample-onboarding-resources\node-master\deps\uv\docs\src\[node-master][deps][uv][docs][src]threading.rst`**, line 165); *backlink***
>> Unknown interpreted text role "c:func".
>
> 3. On z/OS, the timeout parameter for :c:func:`uv_cond_timedwait` is converted to an absolute system time at which the wait expires. If the current system clock time passes the absolute time calculated before the condition is signaled, an ETIMEDOUT error results. After the wait begins, the wait time is not affected by changes to the system clock.
>
>> **System Message: ERROR/3 (**`D:\onboarding-resources\sample-onboarding-resources\node-master\deps\uv\docs\src\[node-master][deps][uv][docs][src]threading.rst`**, line 167); *backlink***
>> Unknown interpreted text role "c:func".

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\node-master\deps\uv\docs\src\[node-master][deps][uv][docs][src]threading.rst`**, line 173)**

Unknown directive type "c:function".

```
.. c:function:: int uv_cond_init(uv_cond_t* cond)
```

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\node-master\deps\uv\docs\src\[node-master][deps][uv][docs][src]threading.rst, line 174`)

Unknown directive type "c:function".

```
.. c:function:: void uv_cond_destroy(uv_cond_t* cond)
```

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\node-master\deps\uv\docs\src\[node-master][deps][uv][docs][src]threading.rst, line 175`)

Unknown directive type "c:function".

```
.. c:function:: void uv_cond_signal(uv_cond_t* cond)
```

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\node-master\deps\uv\docs\src\[node-master][deps][uv][docs][src]threading.rst, line 176`)

Unknown directive type "c:function".

```
.. c:function:: void uv_cond_broadcast(uv_cond_t* cond)
```

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\node-master\deps\uv\docs\src\[node-master][deps][uv][docs][src]threading.rst, line 177`)

Unknown directive type "c:function".

```
.. c:function:: void uv_cond_wait(uv_cond_t* cond, uv_mutex_t* mutex)
```

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\node-master\deps\uv\docs\src\[node-master][deps][uv][docs][src]threading.rst, line 178`)

Unknown directive type "c:function".

```
.. c:function:: int uv_cond_timedwait(uv_cond_t* cond, uv_mutex_t* mutex, uint64_t timeout)
```

Barriers

Functions return 0 on success or an error code < 0 (unless the return type is void, of course).

> **Note**
>
> :c:func:`uv_barrier_wait` returns a value > 0 to an arbitrarily chosen "serializer" thread to facilitate cleanup, i.e.
>
> > **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\node-master\deps\uv\docs\src\[node-master][deps][uv][docs][src]threading.rst, line 187`); *backlink***
> >
> > Unknown interpreted text role "c:func".
>
> ```
> if (uv_barrier_wait(&barrier) > 0)
>     uv_barrier_destroy(&barrier);
> ```

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\node-master\deps\uv\docs\src\[node-master][deps][uv][docs][src]threading.rst, line 195`)

Unknown directive type "c:function".

```
.. c:function:: int uv_barrier_init(uv_barrier_t* barrier, unsigned int count)
```

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\node-master\deps\uv\docs\src\[node-master][deps][uv][docs][src]threading.rst, line 196`)

Unknown directive type "c:function".

```
.. c:function:: void uv_barrier_destroy(uv_barrier_t* barrier)
```

System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\node-master\deps\uv\docs\src\[node-master][deps][uv][docs][src]threading.rst, line 197`)

Unknown directive type "c:function".

```
.. c:function:: int uv_barrier_wait(uv_barrier_t* barrier)
```