



OpenSceneGraph Version 2.9.6

OpenThreads::

Reference Manual

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Main Page

OpenThreads

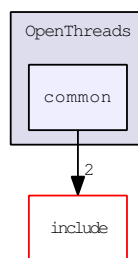
The OpenThreads library is intended to provide a minimal & complete Object-Oriented (OO) thread interface for C++ programmers. It is loosely modeled on the Java thread API, and the POSIX Threads standards. The architecture of the library is designed around "swappable" thread models which are defined at compile-time in a shared object library.

Note: The **OpenThreads** (p. 11) library comes shipped with the OSG installation files.

The documentation you are looking at can be downloaded from www.3draum.ch.

Directory Documentation

2.1 src/OpenThreads/common/ Directory Reference



Files

- file **Atomic.cpp**
- file **Version.cpp**

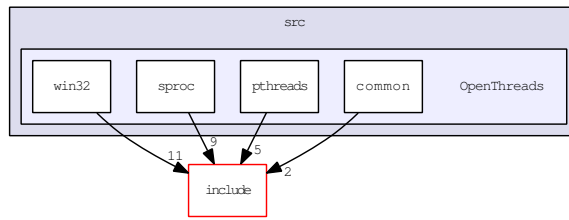
2.2 include/ Directory Reference



Directories

- directory **OpenThreads**

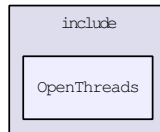
2.3 src/OpenThreads/ Directory Reference



Directories

- directory **common**
- directory **pthreads**
- directory **sproc**
- directory **win32**

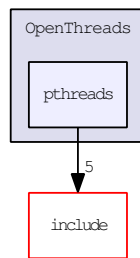
2.4 include/OpenThreads/ Directory Reference



Files

- file **Atomic**
- file **Barrier**
- file **Block**
- file **Condition**
- file **Exports**
- file **mainpage.h**
- file **Mutex**
- file **ReadWriteMutex**
- file **ReentrantMutex**
- file **ScopedLock**
- file **Thread**
- file **Version**

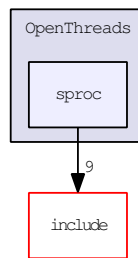
2.5 src/OpenThreads/pthreads/ Directory Reference



Files

- file **PThreadBarrierPrivateData.h**
- file **PThreadConditionPrivateData.h**
- file **PThreadMutexPrivateData.h**
- file **PThreadPrivateData.h**

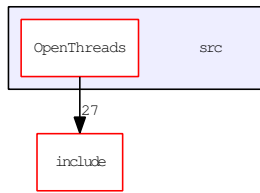
2.6 src/OpenThreads/sproc/ Directory Reference



Files

- file **SharedArena.h**
- file **SprocBarrierPrivateData.h**
- file **SprocConditionPrivateData.h**
- file **SprocMutexPrivateData.h**
- file **SprocThreadPrivateActions.h**
- file **SprocThreadPrivateData.h**

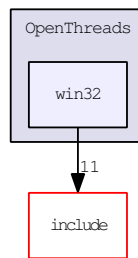
2.7 src/ Directory Reference



Directories

- directory **OpenThreads**

2.8 src/OpenThreads/win32/ Directory Reference



Files

- file **HandleHolder.h**
- file **Win32BarrierPrivateData.h**
- file **WIN32Condition.cpp**
- file **Win32Condition.h**
- file **Win32ConditionPrivateData.h**
- file **Win32Mutex.cpp**
- file **Win32MutexPrivateData.h**
- file **Win32Thread.cpp**
- file **Win32ThreadBarrier.cpp**
- file **Win32ThreadPrivateData.h**

Namespace Documentation

3.1 OpenThreads Namespace Reference

Classes

- class **Atomic**
This class provides an atomic increment and decrement operation.
- class **AtomicPtr**
This class provides an atomic pointer assignment using cas operations.
- class **Barrier**
This class provides an object-oriented thread barrier interface.
- class **Block**
***Block** (p. 18) is a block that can be used to halt a thread that is waiting another thread to release it.*
- class **BlockCount**
***BlockCount** (p. 20) is a block that can be used to halt a thread that is waiting for a specified number of operations to be completed.*
- class **Condition**
This class provides an object-oriented thread condition interface.
- class **HandleHolder**
- class **Mutex**
This class provides an object-oriented thread mutex interface.
- class **PThreadBarrierPrivateData**
- class **PThreadConditionPrivateData**
- class **PThreadMutexPrivateData**
- class **PThreadPrivateData**
- class **ReadWriteMutex**
- class **ReentrantMutex**
- class **ReverseScopedLock**
- class **ReverseScopedPointerLock**
- class **ScopedLock**
- class **ScopedPointerLock**
- class **ScopedReadLock**
- class **ScopedWriteLock**
- class **SemaLink**
- class **SharedArena**
- class **SprocBarrierPrivateData**
- class **SprocConditionPrivateData**

- class **SprocMutexPrivateData**
- class **SprocThreadPrivateData**
- class **Thread**

This class provides an object-oriented thread interface.

- class **ThreadPrivateActions**
- class **Win32BarrierPrivateData**
- class **Win32ConditionPrivateData**
- class **Win32MutexPrivateData**
- class **Win32ThreadPrivateData**

Functions

- DWORD **cooperativeWait** (HANDLE waitHandle, unsigned long timeout)
- OPENTHREAD_EXPORT_DIRECTIVE int **GetNumberOfProcessors** ()

Get the number of processors.

- OPENTHREAD_EXPORT_DIRECTIVE int **SetProcessorAffinityOfCurrentThread** (unsigned int cpunum)

Set the processor affinity of current thread.

3.1.1 Function Documentation

3.1.1.1 DWORD cooperativeWait (HANDLE waitHandle, unsigned long timeout)

3.1.1.2 int GetNumberOfProcessors ()

Get the number of processors. Note, systems where no support exists for querying the number of processors, 1 is returned.

3.1.1.3 int SetProcessorAffinityOfCurrentThread (unsigned int cpunum)

Set the processor affinity of current thread. Note, systems where no support exists no affinity will be set, and -1 will be returned.

3.2 Producer Namespace Reference

Classes

- class **Condition**

Class Documentation

4.1 Atomic Class Reference

This class provides an atomic increment and decrement operation.

Public Member Functions

- **Atomic** (unsigned value=0)
- `_OPENTHREADS_ATOMIC_INLINE` unsigned **AND** (unsigned value)
- `_OPENTHREADS_ATOMIC_INLINE` unsigned **exchange** (unsigned value=0)
- `_OPENTHREADS_ATOMIC_INLINE` **operator unsigned** () const
- `_OPENTHREADS_ATOMIC_INLINE` unsigned **operator++** ()
- `_OPENTHREADS_ATOMIC_INLINE` unsigned **operator--** ()
- `_OPENTHREADS_ATOMIC_INLINE` unsigned **OR** (unsigned value)
- `_OPENTHREADS_ATOMIC_INLINE` unsigned **XOR** (unsigned value)

4.1.1 Detailed Description

This class provides an atomic increment and decrement operation.

4.1.2 Constructor & Destructor Documentation

4.1.2.1 **Atomic** (unsigned *value* = 0) [`inline`]

4.1.3 Member Function Documentation

4.1.3.1 `_OPENTHREADS_ATOMIC_INLINE` unsigned **AND** (unsigned *value*)

4.1.3.2 `_OPENTHREADS_ATOMIC_INLINE` unsigned **exchange** (unsigned *value* = 0)

4.1.3.3 `_OPENTHREADS_ATOMIC_INLINE` **operator unsigned** () const

4.1.3.4 `_OPENTHREADS_ATOMIC_INLINE` unsigned **operator++** ()

4.1.3.5 `_OPENTHREADS_ATOMIC_INLINE` unsigned **operator--** ()

4.1.3.6 `_OPENTHREADS_ATOMIC_INLINE` unsigned **OR** (unsigned *value*)

4.1.3.7 `_OPENTHREADS_ATOMIC_INLINE` unsigned **XOR** (unsigned *value*)

The documentation for this class was generated from the following file:

- **Atomic**

4.2 AtomicPtr Class Reference

This class provides an atomic pointer assignment using cas operations.

Public Member Functions

- **AtomicPtr** (void *ptr=0)
- **~AtomicPtr** ()
- `_OPENTHREADS_ATOMIC_INLINE` bool **assign** (void *ptrNew, const void *const ptrOld)
- `_OPENTHREADS_ATOMIC_INLINE` void * **get** () const

4.2.1 Detailed Description

This class provides an atomic pointer assignment using cas operations.

4.2.2 Constructor & Destructor Documentation

4.2.2.1 AtomicPtr (void * ptr = 0) [inline]

4.2.2.2 ~AtomicPtr () [inline]

4.2.3 Member Function Documentation

4.2.3.1 _OPENTHREADS_ATOMIC_INLINE bool assign (void * ptrNew, const void *const ptrOld)

4.2.3.2 _OPENTHREADS_ATOMIC_INLINE void * get () const

The documentation for this class was generated from the following file:

- **Atomic**

4.3 Barrier Class Reference

This class provides an object-oriented thread barrier interface.

Public Member Functions

- **Barrier** (int numThreads=0)
Constructor.
- virtual **~Barrier** ()
Destructor.
- virtual void **block** (unsigned int numThreads=0)
Block (p. 18) until numThreads threads have entered the barrier.
- void **invalidate** ()
- virtual int **numThreadsCurrentlyBlocked** ()
Return the number of threads currently blocked in the barrier, Return -1 if error.
- virtual void **release** ()
Release the barrier, now.
- virtual void **reset** ()
Reset the barrier to it's original state.

4.3.1 Detailed Description

This class provides an object-oriented thread barrier interface. Warning It is unwise to use the construct "Barrier barrier" in the global namespace on sgi's. The object "barrier" will conflict with the c-library sproc function "barrier" and unpredictable results may occur. You have been warned.

4.3.2 Constructor & Destructor Documentation

4.3.2.1 Barrier (int numThreads = 0)

Constructor.

4.3.2.2 ~Barrier () [virtual]

Destructor.

4.3.3 Member Function Documentation

4.3.3.1 void block (unsigned int numThreads = 0) [virtual]

Block (p. 18) until numThreads threads have entered the barrier.

4.3.3.2 void invalidate ()

4.3.3.3 int numThreadsCurrentlyBlocked () [virtual]

Return the number of threads currently blocked in the barrier, Return -1 if error.

4.3.3.4 void release () [virtual]

Release the barrier, now.

4.3.3.5 void reset () [virtual]

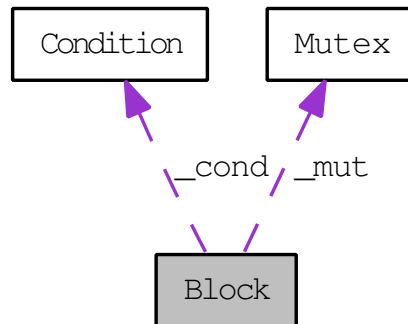
Reset the barrier to it's original state.

The documentation for this class was generated from the following files:

- **Barrier**
- **Win32ThreadBarrier.cpp**

4.4 Block Class Reference

Block (p. 18) is a block that can be used to halt a thread that is waiting another thread to release it. Collaboration diagram for Block:



Public Member Functions

- **Block** ()
- **~Block** ()
- **bool block** (unsigned long timeout)
- **bool block** ()
- **void release** ()
- **void reset** ()
- **void set** (bool doRelease)

Protected Attributes

- **Condition _cond**
- **Mutex _mut**
- **bool _released**

4.4.1 Detailed Description

Block (p. 18) is a block that can be used to halt a thread that is waiting another thread to release it.

4.4.2 Constructor & Destructor Documentation

4.4.2.1 **Block** () [inline]

4.4.2.2 **~Block** () [inline]

4.4.3 Member Function Documentation

4.4.3.1 **bool block** (unsigned long *timeout*) [inline]

4.4.3.2 **bool block** () [inline]

4.4.3.3 **void release** () [inline]

4.4.3.4 **void reset** () [inline]

4.4.3.5 **void set** (bool *doRelease*) [inline]

4.4.4 Member Data Documentation

4.4.4.1 **Condition _cond** [protected]

4.4.4.2 **Mutex _mut** [protected]

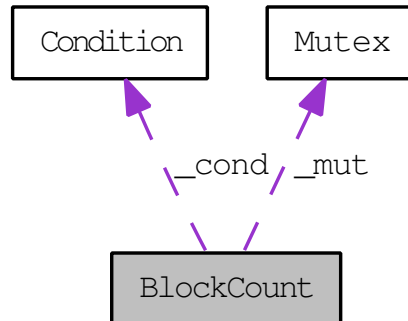
4.4.4.3 **bool _released** [protected]

The documentation for this class was generated from the following file:

- **Block**

4.5 BlockCount Class Reference

BlockCount (p. 20) is a block that can be used to halt a thread that is waiting for a specified number of operations to be completed. Collaboration diagram for BlockCount:



Public Member Functions

- **BlockCount** (unsigned int blockCount)
- **~BlockCount** ()
- void **block** ()
- void **completed** ()
- unsigned int **getBlockCount** () const
- unsigned int **getCurrentCount** () const
- void **release** ()
- void **reset** ()
- void **setBlockCount** (unsigned int blockCount)

Protected Attributes

- unsigned int **_blockCount**
- **OpenThreads::Condition** **_cond**
- unsigned int **_currentCount**
- **OpenThreads::Mutex** **_mut**

4.5.1 Detailed Description

BlockCount (p. 20) is a block that can be used to halt a thread that is waiting for a specified number of operations to be completed.

4.5.2 Constructor & Destructor Documentation

4.5.2.1 `BlockCount (unsigned int blockCount)` [`inline`]

4.5.2.2 `~BlockCount ()` [`inline`]

4.5.3 Member Function Documentation

4.5.3.1 `void block ()` [`inline`]

4.5.3.2 `void completed ()` [`inline`]

4.5.3.3 `unsigned int getBlockCount () const` [`inline`]

4.5.3.4 `unsigned int getCurrentCount () const` [`inline`]

4.5.3.5 `void release ()` [`inline`]

4.5.3.6 `void reset ()` [`inline`]

4.5.3.7 `void setBlockCount (unsigned int blockCount)` [`inline`]

4.5.4 Member Data Documentation

4.5.4.1 `unsigned int _blockCount` [`protected`]

4.5.4.2 `OpenThreads::Condition _cond` [`protected`]

4.5.4.3 `unsigned int _currentCount` [`protected`]

4.5.4.4 `OpenThreads::Mutex _mut` [`protected`]

The documentation for this class was generated from the following file:

- `Block`

4.6 Condition Class Reference

```
#include <OpenThreads/win32/Win32Condition.h>
```

Public Member Functions

- **Condition** (long *max*)
number of waiters.
- **~Condition** ()
- int **broadcast** ()
- int **wait** (Mutex &*external_mutex*)

Protected Attributes

- pthread_cond_t **_cond**

4.6.1 Constructor & Destructor Documentation

4.6.1.1 Condition (long *max*) [inline]

number of waiters.

4.6.1.2 ~Condition () [inline]

4.6.2 Member Function Documentation

4.6.2.1 int broadcast () [inline]

4.6.2.2 int wait (Mutex & *external_mutex*) [inline]

4.6.3 Member Data Documentation

4.6.3.1 pthread_cond_t **_cond** [protected]

The documentation for this class was generated from the following file:

- **Win32Condition.h**

4.7 Condition Class Reference

This class provides an object-oriented thread condition interface.

Public Member Functions

- **Condition** ()
Constructor.
- virtual **~Condition** ()
Destructor.
- virtual int **broadcast** ()
Wake all threads waiting on this condition.
- virtual int **signal** ()
Signal a SINGLE thread to wake if it's waiting.
- virtual int **wait** (**Mutex** *mutex, unsigned long int ms)
Wait on a mutex for a given amount of time (ms).
- virtual int **wait** (**Mutex** *mutex)
Wait on a mutex.

4.7.1 Detailed Description

This class provides an object-oriented thread condition interface.

4.7.2 Constructor & Destructor Documentation

4.7.2.1 Condition ()

Constructor.

4.7.2.2 ~Condition () [virtual]

Destructor.

4.7.3 Member Function Documentation

4.7.3.1 int broadcast () [virtual]

Wake all threads waiting on this condition. Returns 0 if normal, -1 if errno set, errno code otherwise.

4.7.3.2 int signal () [virtual]

Signal a SINGLE thread to wake if it's waiting. Returns 0 if normal, -1 if errno set, errno code otherwise.

4.7.3.3 virtual int wait (Mutex * mutex, unsigned long int ms) [virtual]

Wait on a mutex for a given amount of time (ms). Returns 0 if normal, -1 if errno set, errno code otherwise.

4.7.3.4 int wait (Mutex * mutex) [virtual]

Wait on a mutex.

The documentation for this class was generated from the following files:

- **Condition**
- **WIN32Condition.cpp**

4.8 HandleHolder Class Reference

```
#include <OpenThreads/win32/HandleHolder.h>
```

Public Member Functions

- **HandleHolder** (HANDLE *h*)
- **HandleHolder** ()
- **~HandleHolder** ()
- const HANDLE & **get** () const
- **operator bool** ()
- void **set** (HANDLE *h*)

4.8.1 Constructor & Destructor Documentation

4.8.1.1 **HandleHolder** () [inline]

4.8.1.2 **HandleHolder** (HANDLE *h*) [inline, explicit]

4.8.1.3 **~HandleHolder** () [inline]

4.8.2 Member Function Documentation

4.8.2.1 const HANDLE& **get** () const [inline]

4.8.2.2 **operator bool** () [inline]

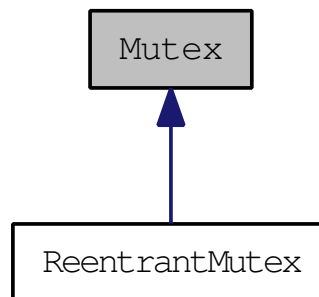
4.8.2.3 void **set** (HANDLE *h*) [inline]

The documentation for this class was generated from the following file:

- **HandleHolder.h**

4.9 Mutex Class Reference

This class provides an object-oriented thread mutex interface. Inheritance diagram for Mutex:



Public Member Functions

- **Mutex ()**
Constructor.
- virtual **~Mutex ()**
Destructor.
- virtual int **lock ()**
Lock the mutex.
- virtual int **trylock ()**
Test if mutex can be locked.
- virtual int **unlock ()**
Unlock the mutex.

Friends

- class **Condition**

4.9.1 Detailed Description

This class provides an object-oriented thread mutex interface.

4.9.2 Constructor & Destructor Documentation

4.9.2.1 Mutex ()

Constructor.

4.9.2.2 ~Mutex () [virtual]

Destructor.

4.9.3 Member Function Documentation

4.9.3.1 int lock () [virtual]

Lock the mutex. Returns 0 if normal, -1 if errno set, errno code otherwise.

Reimplemented in **ReentrantMutex** (p. 33).

4.9.3.2 int trylock () [virtual]

Test if mutex can be locked. Returns 0 if normal, -1 if errno set, errno code otherwise.

Reimplemented in **ReentrantMutex** (p. 33).

4.9.3.3 int unlock () [virtual]

Unlock the mutex. Returns 0 if normal, -1 if errno set, errno code otherwise.

Reimplemented in **ReentrantMutex** (p. 34).

4.9.4 Friends And Related Function Documentation

4.9.4.1 friend class Condition [friend]

The documentation for this class was generated from the following files:

- **Mutex**
- **Win32Mutex.cpp**

4.10 PThreadBarrierPrivateData Class Reference

```
#include <OpenThreads/pthreads/PThreadBarrierPrivateData.h>
```

Friends

- class **Barrier**

4.10.1 Friends And Related Function Documentation

4.10.1.1 friend class **Barrier** [friend]

The documentation for this class was generated from the following file:

- **PThreadBarrierPrivateData.h**

4.11 PThreadConditionPrivateData Class Reference

```
#include <OpenThreads/pthreads/PThreadConditionPrivateData.h>
```

Friends

- class **Condition**

4.11.1 Friends And Related Function Documentation

4.11.1.1 friend class **Condition** [friend]

The documentation for this class was generated from the following file:

- **PThreadConditionPrivateData.h**

4.12 PThreadMutexPrivateData Class Reference

```
#include <OpenThreads/pthreads/PThreadMutexPrivateData.h>
```

Friends

- class **Condition**
- class **Mutex**

4.12.1 Friends And Related Function Documentation

4.12.1.1 friend class **Condition** [friend]

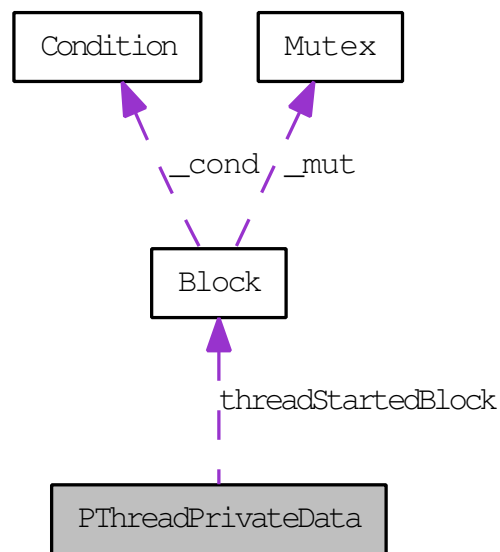
4.12.1.2 friend class **Mutex** [friend]

The documentation for this class was generated from the following file:

- **PThreadMutexPrivateData.h**

4.13 PThreadPrivateData Class Reference

#include <OpenThreads/pthreads/PThreadPrivateData.h> Collaboration diagram for PThreadPrivateData:



Friends

- class `Thread`
- class `ThreadPrivateActions`

4.13.1 Friends And Related Function Documentation

4.13.1.1 friend class `Thread` [friend]

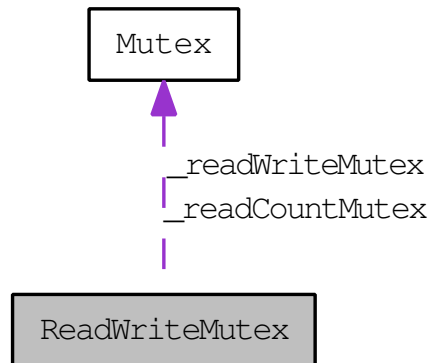
4.13.1.2 friend class `ThreadPrivateActions` [friend]

The documentation for this class was generated from the following file:

- `PThreadPrivateData.h`

4.14 ReadWriteMutex Class Reference

Collaboration diagram for ReadWriteMutex:



Public Member Functions

- **ReadWriteMutex** ()
- virtual **~ReadWriteMutex** ()
- virtual int **readLock** ()
- virtual int **readUnlock** ()
- virtual int **writeLock** ()
- virtual int **writeUnlock** ()

Protected Member Functions

- **ReadWriteMutex** (const **ReadWriteMutex** &)
- **ReadWriteMutex** & **operator=** (const **ReadWriteMutex** &)

Protected Attributes

- unsigned int **_readCount**
- **OpenThreads::Mutex** **_readCountMutex**
- **OpenThreads::Mutex** **_readWriteMutex**

4.14.1 Constructor & Destructor Documentation

4.14.1.1 **ReadWriteMutex** () [inline]

4.14.1.2 virtual **~ReadWriteMutex** () [inline, virtual]

4.14.1.3 **ReadWriteMutex** (const **ReadWriteMutex** &) [inline, protected]

4.14.2 Member Function Documentation

4.14.2.1 **ReadWriteMutex**& **operator=** (const **ReadWriteMutex** &) [inline, protected]

4.14.2.2 virtual int **readLock** () [inline, virtual]

4.14.2.3 virtual int **readUnlock** () [inline, virtual]

4.14.2.4 virtual int **writeLock** () [inline, virtual]

4.14.2.5 virtual int **writeUnlock** () [inline, virtual]

4.14.3 Member Data Documentation

4.14.3.1 unsigned int **_readCount** [protected]

4.14.3.2 **OpenThreads::Mutex** **_readCountMutex** [protected]

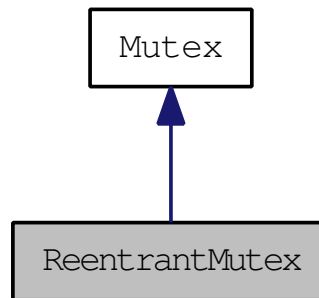
4.14.3.3 **OpenThreads::Mutex** **_readWriteMutex** [protected]

The documentation for this class was generated from the following file:

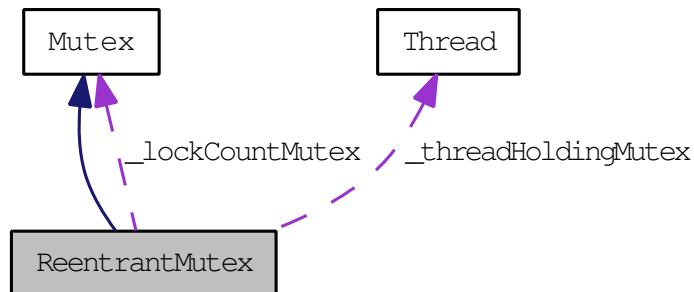
- **ReadWriteMutex**

4.15 ReentrantMutex Class Reference

Inheritance diagram for ReentrantMutex:



Collaboration diagram for ReentrantMutex:



Public Member Functions

- `ReentrantMutex ()`
- `virtual ~ReentrantMutex ()`
- `virtual int lock ()`
Lock the mutex.
- `virtual int trylock ()`
Test if mutex can be locked.
- `virtual int unlock ()`
Unlock the mutex.

4.15.1 Constructor & Destructor Documentation

4.15.1.1 `ReentrantMutex () [inline]`

4.15.1.2 `virtual ~ReentrantMutex () [inline, virtual]`

4.15.2 Member Function Documentation

4.15.2.1 `virtual int lock () [inline, virtual]`

Lock the mutex. Returns 0 if normal, -1 if errno set, errno code otherwise.

Reimplemented from **Mutex** (p. 25).

4.15.2.2 `virtual int trylock () [inline, virtual]`

Test if mutex can be locked. Returns 0 if normal, -1 if errno set, errno code otherwise.

Reimplemented from **Mutex** (p. 26).

4.15.2.3 virtual int unlock () [inline, virtual]

Unlock the mutex. Returns 0 if normal, -1 if errno set, errno code otherwise.

Reimplemented from **Mutex** (p. 26).

The documentation for this class was generated from the following file:

- **ReentrantMutex**

4.16 ReverseScopedLock< M > Class Template Reference

Public Member Functions

- `ReverseScopedLock (M &m)`
- `~ReverseScopedLock ()`

`template<class M> class OpenThreads::ReverseScopedLock< M >`

4.16.1 Constructor & Destructor Documentation

4.16.1.1 `ReverseScopedLock (M & m) [inline, explicit]`

4.16.1.2 `~ReverseScopedLock () [inline]`

The documentation for this class was generated from the following file:

- `ScopedLock`

4.17 ReverseScopedPointerLock< M > Class Template Reference

Public Member Functions

- `ReverseScopedPointerLock (M *m)`
- `~ReverseScopedPointerLock ()`

`template<class M> class OpenThreads::ReverseScopedPointerLock< M >`

4.17.1 Constructor & Destructor Documentation

4.17.1.1 `ReverseScopedPointerLock (M * m)` [`inline`, `explicit`]

4.17.1.2 `~ReverseScopedPointerLock ()` [`inline`]

The documentation for this class was generated from the following file:

- `ScopedLock`

4.18 ScopedLock< M > Class Template Reference

Public Member Functions

- **ScopedLock** (M &m)
- **~ScopedLock** ()

```
template<class M> class OpenThreads::ScopedLock< M >
```

4.18.1 Constructor & Destructor Documentation

4.18.1.1 **ScopedLock** (M & *m*) [inline, explicit]

4.18.1.2 **~ScopedLock** () [inline]

The documentation for this class was generated from the following file:

- **ScopedLock**

4.19 ScopedPointerLock< M > Class Template Reference

Public Member Functions

- `ScopedPointerLock (M *m)`
- `~ScopedPointerLock ()`

`template<class M> class OpenThreads::ScopedPointerLock< M >`

4.19.1 Constructor & Destructor Documentation

4.19.1.1 `ScopedPointerLock (M * m)` [`inline`, `explicit`]

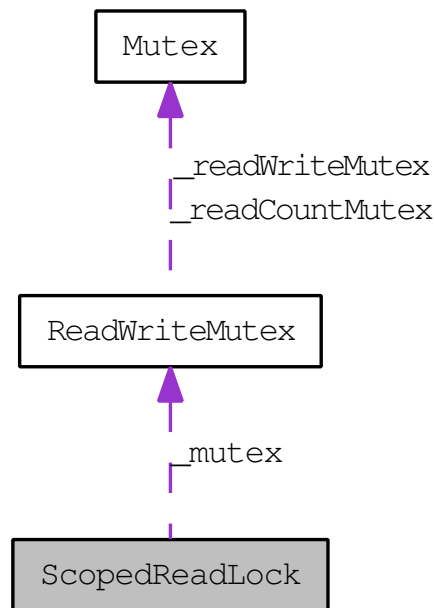
4.19.1.2 `~ScopedPointerLock ()` [`inline`]

The documentation for this class was generated from the following file:

- `ScopedLock`

4.20 ScopedReadLock Class Reference

Collaboration diagram for ScopedReadLock:



Public Member Functions

- `ScopedReadLock (ReadWriteMutex &mutex)`
- `~ScopedReadLock ()`

Protected Member Functions

- `ScopedReadLock & operator= (const ScopedReadLock &)`

Protected Attributes

- `ReadWriteMutex & _mutex`

4.20.1 Constructor & Destructor Documentation

4.20.1.1 `ScopedReadLock (ReadWriteMutex & mutex) [inline]`

4.20.1.2 `~ScopedReadLock () [inline]`

4.20.2 Member Function Documentation

4.20.2.1 `ScopedReadLock& operator= (const ScopedReadLock &) [inline, protected]`

4.20.3 Member Data Documentation

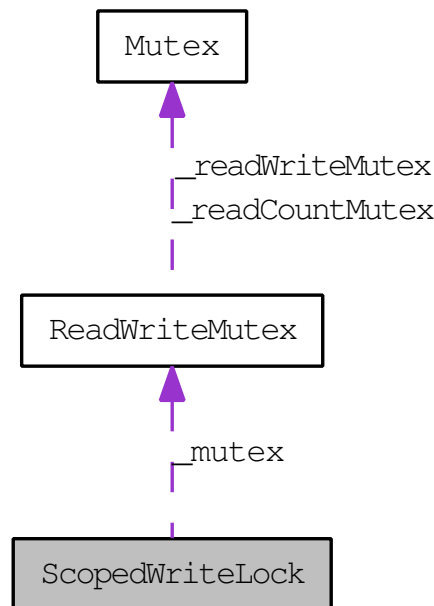
4.20.3.1 `ReadWriteMutex& _mutex [protected]`

The documentation for this class was generated from the following file:

- `ReadWriteMutex`

4.21 ScopedWriteLock Class Reference

Collaboration diagram for ScopedWriteLock:



Public Member Functions

- **ScopedWriteLock** (**ReadWriteMutex** &mutex)
- **~ScopedWriteLock** ()

Protected Member Functions

- **ScopedWriteLock** & operator= (const **ScopedWriteLock** &)

Protected Attributes

- **ReadWriteMutex** & `_mutex`

4.21.1 Constructor & Destructor Documentation

4.21.1.1 **ScopedWriteLock** (**ReadWriteMutex** & *mutex*) [inline]

4.21.1.2 **~ScopedWriteLock** () [inline]

4.21.2 Member Function Documentation

4.21.2.1 **ScopedWriteLock**& operator= (const **ScopedWriteLock** &) [inline, protected]

4.21.3 Member Data Documentation

4.21.3.1 **ReadWriteMutex**& `_mutex` [protected]

The documentation for this class was generated from the following file:

- **ReadWriteMutex**

4.22 SemaLink Class Reference

#include <OpenThreads/sproc/SprocConditionPrivateData.h> Collaboration diagram for SemaLink:



Friends

- class **Condition**
- class **ConditionDebug**
- class **SprocConditionPrivatedata**

4.22.1 Friends And Related Function Documentation

4.22.1.1 friend class **Condition** [friend]

4.22.1.2 friend class **ConditionDebug** [friend]

4.22.1.3 friend class **SprocConditionPrivatedata** [friend]

The documentation for this class was generated from the following file:

- **SprocConditionPrivateData.h**

4.23 SharedArena Class Reference

```
#include <OpenThreads/sproc/SharedArena.h>
```

Friends

- class **Barrier**
- class **Condition**
- class **Mutex**

4.23.1 Friends And Related Function Documentation

4.23.1.1 friend class Barrier [friend]

4.23.1.2 friend class Condition [friend]

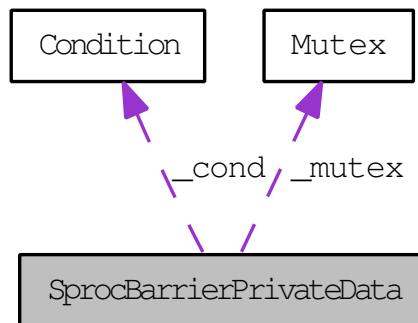
4.23.1.3 friend class Mutex [friend]

The documentation for this class was generated from the following file:

- **SharedArena.h**

4.24 SprocBarrierPrivateData Class Reference

`#include <OpenThreads/sproc/SprocBarrierPrivateData.h>` Collaboration diagram for SprocBarrierPrivateData:



Friends

- class **Barrier**

4.24.1 Friends And Related Function Documentation

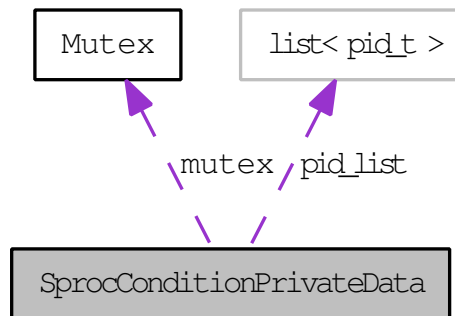
4.24.1.1 friend class Barrier [friend]

The documentation for this class was generated from the following file:

- **SprocBarrierPrivateData.h**

4.25 SprocConditionPrivateData Class Reference

`#include <OpenThreads/sproc/SprocConditionPrivateData.h>` Collaboration diagram for SprocConditionPrivateData:



Friends

- class `Condition`

4.25.1 Friends And Related Function Documentation

4.25.1.1 friend class `Condition` [friend]

The documentation for this class was generated from the following file:

- `SprocConditionPrivateData.h`

4.26 SprocMutexPrivateData Class Reference

```
#include <OpenThreads/sproc/SprocMutexPrivateData.h>
```

Friends

- class **Mutex**
- class **SprocThreadPrivateActions**

4.26.1 Friends And Related Function Documentation

4.26.1.1 friend class **Mutex** [friend]

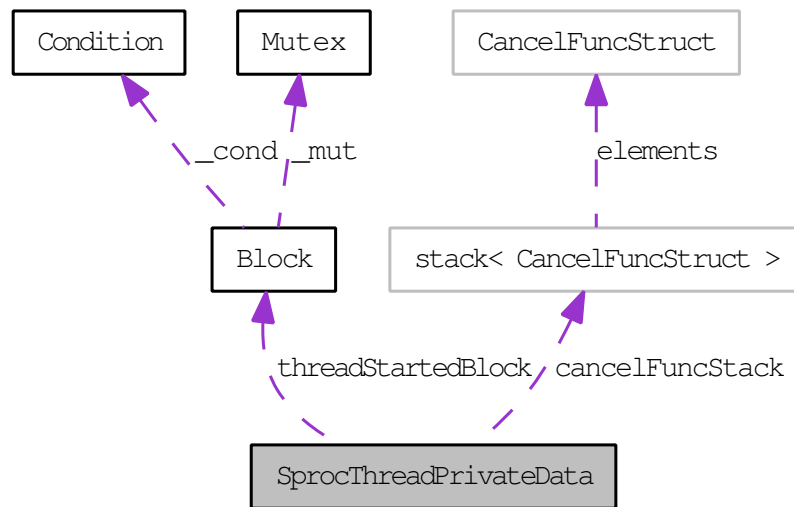
4.26.1.2 friend class **SprocThreadPrivateActions** [friend]

The documentation for this class was generated from the following file:

- **SprocMutexPrivateData.h**

4.27 SprocThreadPrivateData Class Reference

`#include <OpenThreads/sproc/SprocThreadPrivateData.h>` Collaboration diagram for SprocThreadPrivateData:



Classes

- struct **CancelFuncStruct**

Friends

- class **Thread**
- class **ThreadPrivateActions**

4.27.1 Friends And Related Function Documentation

4.27.1.1 friend class **Thread** [friend]

4.27.1.2 friend class **ThreadPrivateActions** [friend]

The documentation for this class was generated from the following file:

- **SprocThreadPrivateData.h**

4.28 Thread Class Reference

This class provides an object-oriented thread interface.

Public Types

- enum **ThreadPolicy** { **THREAD_SCHEDULE_FIFO**, **THREAD_SCHEDULE_ROUND_ROBIN**, **THREAD_SCHEDULE_TIME_SHARE**, **THREAD_SCHEDULE_DEFAULT** }
Enumerated Type for thread scheduling policy.
- enum **ThreadPriority** { **THREAD_PRIORITY_MAX**, **THREAD_PRIORITY_HIGH**, **THREAD_PRIORITY_NOMINAL**, **THREAD_PRIORITY_LOW**, **THREAD_PRIORITY_MIN**, **THREAD_PRIORITY_DEFAULT** }
Enumerated Type for thread priority.

Public Member Functions

- **Thread** ()
Constructor.
- virtual **~Thread** ()
Destructor.
- virtual int **cancel** ()
Cancel the thread.
- virtual void **cancelCleanup** ()
*Thread's cancel cleanup routine, called upon **cancel()** (p. 49), after the cancelation has taken place, but before the thread exits completely.*
- int **detach** ()
Detach the thread from the calling process.
- void * **getImplementation** ()
- size_t **getProcessId** ()
Get the thread's process id.
- int **getSchedulePolicy** ()
Get the thread's policy (if able).
- int **getSchedulePriority** ()
Get the thread's schedule priority (if able).
- size_t **getStackSize** ()
Get the thread's desired stack size.
- int **getThreadId** ()
Get a unique thread id.
- bool **isRunning** ()
Query the thread's running status.
- int **join** ()
Join the calling process with the thread.

- void **printSchedulingInfo** ()
Print the thread's scheduling information to stdout.
- virtual void **run** ()=0
Thread's run method.
- int **setCancelModeAsynchronous** ()
*Mark the thread to cancel asynchronously on **Thread::cancel()** (p. 49).*
- int **setCancelModeDeferred** ()
*Mark the thread to cancel at the earliest convenience on **Thread::cancel()** (p. 49) (This is the default).*
- int **setCancelModeDisable** ()
Disable thread cancelation altogether.
- int **setProcessorAffinity** (unsigned int cpunum)
Thread's processor affinity method.
- int **setSchedulePolicy** (ThreadPolicy policy)
Set the thread's scheduling policy (if able).
- int **setSchedulePriority** (ThreadPriority priority)
Set the thread's schedule priority.
- int **setStackSize** (size_t size)
Set the thread's desired stack size (in bytes).
- int **start** ()
Start the thread.
- int **startThread** ()
- int **testCancel** ()
Test the cancel state of the thread.

Static Public Member Functions

- static Thread * **CurrentThread** ()
Return a pointer to the current running thread.
- static int **GetConcurrency** ()
Get the concurrency level for a running application.
- static ThreadPriority **GetMasterPriority** ()
This method will return the ThreadPriority of the master process.
- static void **Init** ()
Initialize Threading in a program.
- static int **microSleep** (unsigned int microsec)
microSleep method, equivalent to the posix usleep(microsec).
- static int **SetConcurrency** (int concurrencyLevel)
Set the concurrency level for a running application.
- static int **YieldCurrentThread** ()
Yield the processor.

Friends

- class **ThreadPrivateActions**

The Private Actions class is allowed to operate on private data.

4.28.1 Detailed Description

This class provides an object-oriented thread interface.

4.28.2 Member Enumeration Documentation

4.28.2.1 enum ThreadPolicy

Enumerated Type for thread scheduling policy.

Enumerator:

THREAD_SCHEDULE_FIFO First in, First out scheduling.

THREAD_SCHEDULE_ROUND_ROBIN Round-robin scheduling (LINUX_DEFAULT).

THREAD_SCHEDULE_TIME_SHARE Time-share scheduling (IRIX_DEFAULT).

THREAD_SCHEDULE_DEFAULT Default scheduling.

4.28.2.2 enum ThreadPriority

Enumerated Type for thread priority.

Enumerator:

THREAD_PRIORITY_MAX The maximum possible priority.

THREAD_PRIORITY_HIGH A high (but not max) setting.

THREAD_PRIORITY_NOMINAL An average priority.

THREAD_PRIORITY_LOW A low (but not min) setting.

THREAD_PRIORITY_MIN The minimum possible priority.

THREAD_PRIORITY_DEFAULT Priority scheduling default.

4.28.3 Constructor & Destructor Documentation

4.28.3.1 Thread ()

Constructor.

4.28.3.2 ~Thread () [virtual]

Destructor.

4.28.4 Member Function Documentation

4.28.4.1 int cancel () [virtual]

Cancel the thread. Equivalent to SIGKILL.

Returns 0 if normal, -1 if errno set, errno code otherwise.

4.28.4.2 virtual void cancelCleanup () [inline, virtual]

Thread's cancel cleanup routine, called upon **cancel()** (p. 49), after the cancelation has taken place, but before the thread exits completely. This method should be used to repair parts of the thread's data that may have been damaged by a pre-mature cancel. No-op by default.

4.28.4.3 Thread * CurrentThread () [static]

Return a pointer to the current running thread.

4.28.4.4 int detach ()

Detach the thread from the calling process. Returns 0 if normal, -1 if errno set, errno code otherwise.

4.28.4.5 int GetConcurrency () [static]

Get the concurrency level for a running application. In this case, a return code of 0 means that the application is in default mode. A return code of -1 means that the application is incapable of setting an arbitrary concurrency, because it is a one-to-one execution model (sprocs, linuxThreads)

4.28.4.6 void* getImplementation () [inline]

4.28.4.7 static ThreadPriority GetMasterPriority () [inline, static]

This method will return the ThreadPriority of the master process. (ie, the one calling the thread->start() (p. 52) methods for the first time) The method will almost certainly return Thread::THREAD_PRIORITY_DEFAULT (p. 49) if Init() (p. 50) has not been called.

Returns the Thread::ThreadPriority (p. 49) of the master thread.

4.28.4.8 size_t getProcessId ()

Get the thread's process id. This is the pthread_t or pid_t value depending on the threading model being used.

Returns thread process id.

4.28.4.9 int getSchedulePolicy ()

Get the thread's policy (if able). Note setting the environment variable OUTPUT_THREADLIB_SCHEDULING_INFO will output scheduling information for each thread to stdout. Returns policy if normal, -1 if errno set, errno code otherwise.

4.28.4.10 int getSchedulePriority ()

Get the thread's schedule priority (if able). Note setting the environment variable OUTPUT_THREADLIB_SCHEDULING_INFO will output scheduling information for each thread to stdout. Returns 0 if normal, -1 if errno set, errno code otherwise.

4.28.4.11 size_t getStackSize ()

Get the thread's desired stack size. Returns the thread's stack size. 0 indicates that the stack size has either not yet been initialized, or not yet been specified by the application.

4.28.4.12 int getThreadId ()

Get a unique thread id. This id is monotonically increasing.

Returns a unique thread identifier

4.28.4.13 void Init () [static]

Initialize Threading in a program. This method must be called before you can do any threading in a program.

4.28.4.14 bool isRunning ()

Query the thread's running status. Returns true if running, false if not.

4.28.4.15 int join ()

Join the calling process with the thread. Returns 0 if normal, -1 if errno set, errno code otherwise.

4.28.4.16 int microSleep (unsigned int *microsec*) [static]

microSleep method, equivalent to the posix usleep(microsec). This is not strictly thread API but is used so often with threads. It's basically UNIX usleep. Parameter is number of microseconds we current thread to sleep. Returns 0 on succes, non-zero on failure (UNIX errno or GetLastError() will give detailed description.

4.28.4.17 void printSchedulingInfo ()

Print the thread's scheduling information to stdout.

4.28.4.18 virtual void run () [pure virtual]

Thread's run method. Must be implemented by derived classes. This is where the action happens.

4.28.4.19 int setCancelModeAsynchronous ()

Mark the thread to cancel asynchronously on **Thread::cancel()** (p. 49). (May not be available with process-level implementations).

Returns 0 if normal, -1 if errno set, errno code otherwise.

4.28.4.20 int setCancelModeDeferred ()

Mark the thread to cancel at the earliest convenience on **Thread::cancel()** (p. 49) (This is the default). Returns 0 if normal, -1 if errno set, errno code otherwise.

4.28.4.21 int setCancelModeDisable ()

Disable thread cancelation altogether. **Thread::cancel()** (p. 49) has no effect.

Returns 0 if normal, -1 if errno set, errno code otherwise.

4.28.4.22 int SetConcurrency (int *concurrencyLevel*) [static]

Set the concurrency level for a running application. This method only has effect if the pthreads thread model is being used, and then only when that model is many-to-one (eg. irix). In other cases it is ignored. The concurrency level is only a **hint** as to the number of execution vehicles to use, the actual implementation may do anything it wants. Setting the value to 0 returns things to their default state.

Returns previous concurrency level, -1 indicates no-op.

4.28.4.23 int setProcessorAffinity (unsigned int *cpunum*)

Thread's processor affinity method. This binds a thread to a processor whenever possible. This call must be made before **start()** (p. 52) or **startThread()** (p. 52) and has no effect after the thread has been running. In the pthreads implementation, this is only implemented on sgi, through a pthread extension. On other pthread platforms this is ignored. Returns 0 on success, implementation's error on failure, or -1 if ignored.

4.28.4.24 int setSchedulePolicy (ThreadPolicy *policy*)

Set the thread's scheduling policy (if able). Note On some implementations (notably IRIX Sprocs & LinuxThreads) The policy may prohibit the use of SCHEDULE_ROUND_ROBIN and SCHEDULE_FIFO policies - due to their real-time nature, and the danger of deadlocking the machine when used as super-user. In such cases, the command is a no-op.

setting the environment variable OUTPUT_THREADLIB_SCHEDULING_INFO will output scheduling information for each thread to stdout. Returns 0 if normal, -1 if errno set, errno code otherwise.

4.28.4.25 int setSchedulePriority (ThreadPriority *priority*)

Set the thread's schedule priority. This is a complex method. Beware of thread priorities when using a many-to-many kernel entity implementation (such as IRIX pthreads). If one is not careful to manage the thread priorities, a priority inversion deadlock can easily occur (Although the **OpenThreads::Mutex** (p. 25) & **OpenThreads::Barrier** (p. 17) constructs have been designed with this scenario in mind). Unless you have explicit need to set the schedule priorities for a given task, it is best to leave them alone.

Note some implementations (notably LinuxThreads and IRIX Sprocs) only allow you to decrease thread priorities dynamically. Thus, a lower priority thread will not allow its priority to be raised on the fly.

setting the environment variable OUTPUT_THREADLIB_SCHEDULING_INFO will output scheduling information for each thread to stdout. Returns 0 if normal, -1 if errno set, errno code otherwise.

4.28.4.26 int setStackSize (size_t *size*)

Set the thread's desired stack size (in bytes). This method is an attribute of the thread and must be called **before** the **start()** (p. 52) method is invoked.

Note a return code of 13 (EACCESS) means that the thread stack size can no longer be changed. Returns 0 if normal, -1 if errno set, errno code otherwise.

4.28.4.27 int start ()

Start the thread. This method will configure the thread, set it's priority, and spawn it.

Note if the stack size specified `setStackSize` is smaller than the smallest allowable stack size, the threads stack size will be set to the minimum allowed, and may be retrieved via the `getStackSize()` (p. 50) Returns 0 if normal, -1 if `errno` set, `errno` code otherwise.

4.28.4.28 int startThread ()**4.28.4.29 int testCancel ()**

Test the cancel state of the thread. If the thread has been canceled this method will cause the thread to exit now. This method operates on the calling thread.

Returns 0 if normal, -1 if called from a thread other than this.

4.28.4.30 int YieldCurrentThread () [static]

Yield the processor. Note This method operates on the calling process. And is equivalent to calling `sched_yield()`. Returns 0 if normal, -1 if `errno` set, `errno` code otherwise.

4.28.5 Friends And Related Function Documentation**4.28.5.1 friend class ThreadPrivateActions [friend]**

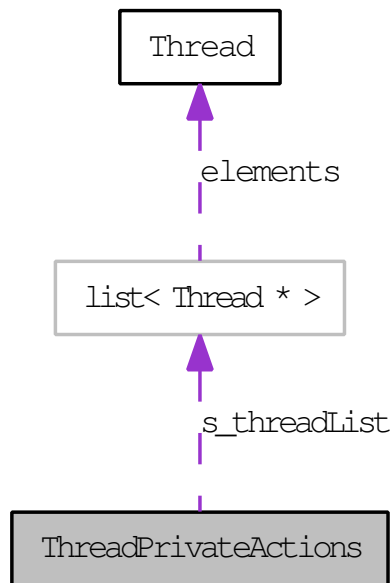
The Private Actions class is allowed to operate on private data.

The documentation for this class was generated from the following files:

- **Thread**
- **Win32Thread.cpp**

4.29 ThreadPrivateActions Class Reference

#include <OpenThreads/sproc/SprocThreadPrivateActions.h> Collaboration diagram for ThreadPrivateActions:



Static Public Member Functions

- static void **PopCancelFunction** ()
- static void **PushCancelFunction** (void(*routine)(void *), void *arg)
- static void **ThreadCancelTest** ()

Friends

- class **Thread**

4.29.1 Member Function Documentation

4.29.1.1 static void **PopCancelFunction** () [static]

4.29.1.2 static void **PushCancelFunction** (void(*) (void *) *routine*, void * *arg*) [static]

4.29.1.3 static void **ThreadCancelTest** () [static]

4.29.2 Friends And Related Function Documentation

4.29.2.1 **Thread** [friend]

The documentation for this class was generated from the following files:

- **SprocThreadPrivateActions.h**
- **Win32Thread.cpp**

4.30 TlsHolder Struct Reference

```
#include <OpenThreads/win32/Win32ThreadPrivateData.h>
```

Public Member Functions

- **TlsHolder** ()
- **~TlsHolder** ()
- **DWORD getId** ()

4.30.1 Constructor & Destructor Documentation

4.30.1.1 TlsHolder () [inline]

4.30.1.2 ~TlsHolder () [inline]

4.30.2 Member Function Documentation

4.30.2.1 DWORD getId () [inline]

The documentation for this struct was generated from the following file:

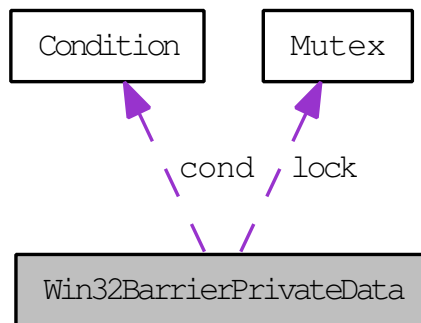
- **Win32ThreadPrivateData.h**

4.31 Win32BarrierPrivateData Class Reference

```
#include <OpenThreads/win32/Win32BarrierPrivateData.h>
Win32BarrierPrivateData:
```

diagram

for



Friends

- class **Barrier**

4.31.1 Friends And Related Function Documentation

4.31.1.1 friend class **Barrier** [friend]

The documentation for this class was generated from the following files:

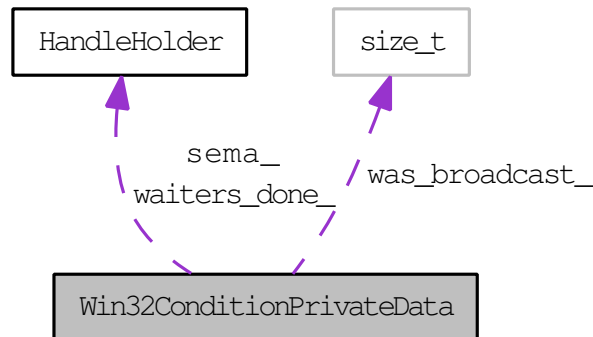
- **Win32BarrierPrivateData.h**
- **Win32ThreadBarrier.cpp**

4.32 Win32ConditionPrivateData Class Reference

#include <OpenThreads/win32/Win32ConditionPrivateData.h> Collaboration
Win32ConditionPrivateData:

diagram

for



Public Member Functions

- **Win32ConditionPrivateData** ()
- **~Win32ConditionPrivateData** ()
- int **broadcast** ()
- int **signal** ()
- int **wait** (**Mutex** &external_mutex, long timeout_ms)

Public Attributes

- long **waiters_**
number of waiters.

Protected Attributes

- **HandleHolder sema_**
Serialize access to the waiters count.
- **HandleHolder waiters_done_**
An auto reset event used by the broadcast/signal thread to wait for the waiting thread(s) to wake up and get a chance at the semaphore.
- **size_t was_broadcast_**
Keeps track of whether we were broadcasting or just signaling.

Friends

- class **Condition**

4.32.1 Constructor & Destructor Documentation

4.32.1.1 Win32ConditionPrivateData () [inline]

4.32.1.2 ~Win32ConditionPrivateData ()

4.32.2 Member Function Documentation

4.32.2.1 int broadcast () [inline]

4.32.2.2 int signal () [inline]

4.32.2.3 int wait (Mutex & *external_mutex*, long *timeout_ms*) [inline]

4.32.3 Friends And Related Function Documentation

4.32.3.1 friend class Condition [friend]

4.32.4 Member Data Documentation

4.32.4.1 HandleHolder sema_ [protected]

Serialize access to the waiters count. **Mutex** (p. 25) waiters_lock_; Queue up threads waiting for the condition to become signaled.

4.32.4.2 long waiters_

number of waiters.

4.32.4.3 HandleHolder waiters_done_ [protected]

An auto reset event used by the broadcast/signal thread to wait for the waiting thread(s) to wake up and get a chance at the semaphore.

4.32.4.4 size_t was_broadcast_ [protected]

Keeps track of whether we were broadcasting or just signaling.

The documentation for this class was generated from the following files:

- Win32ConditionPrivateData.h
- WIN32Condition.cpp

4.33 Win32MutexPrivateData Class Reference

```
#include <OpenThreads/win32/Win32MutexPrivateData.h>
```

Friends

- class **Condition**
- class **Mutex**

4.33.1 Friends And Related Function Documentation

4.33.1.1 friend class **Condition** [friend]

4.33.1.2 friend class **Mutex** [friend]

The documentation for this class was generated from the following files:

- **Win32MutexPrivateData.h**
- **Win32Mutex.cpp**

4.34 Win32ThreadCanceled Struct Reference

The documentation for this struct was generated from the following file:

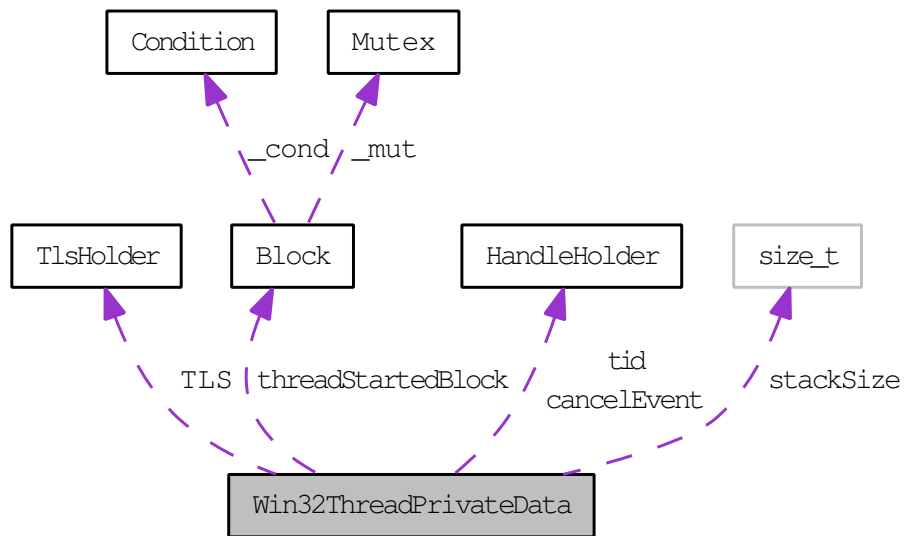
- **Win32Thread.cpp**

4.35 Win32ThreadPrivateData Class Reference

#include <OpenThreads/win32/Win32ThreadPrivateData.h> Collaboration
Win32ThreadPrivateData:

diagram

for



Classes

- struct **TlsHolder**

Public Attributes

- **HandleHolder** cancelEvent

Static Public Attributes

- static **TlsHolder** TLS

Friends

- class **Thread**
- class **ThreadPrivateActions**

4.35.1 Friends And Related Function Documentation

4.35.1.1 friend class **Thread** [friend]

4.35.1.2 friend class **ThreadPrivateActions** [friend]

4.35.2 Member Data Documentation

4.35.2.1 **HandleHolder** cancelEvent

4.35.2.2 **Win32ThreadPrivateData::TlsHolder** TLS [static]

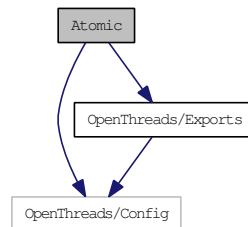
The documentation for this class was generated from the following files:

- **Win32ThreadPrivateData.h**
- **Win32Thread.cpp**

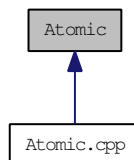
File Documentation

5.1 Atomic File Reference

```
#include <OpenThreads/Config>
#include <OpenThreads/Exports>
Include dependency graph for Atomic:
```



This graph shows which files directly or indirectly include this file:



Classes

- class **Atomic**
This class provides an atomic increment and decrement operation.
- class **AtomicPtr**
This class provides an atomic pointer assignment using cas operations.

Namespaces

- namespace **OpenThreads**

Defines

- #define **_OPENTHREADS_ATOMIC_INLINE** inline

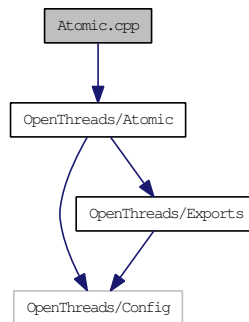
5.1.1 Define Documentation

5.1.1.1 #define **_OPENTHREADS_ATOMIC_INLINE** inline

5.2 Atomic.cpp File Reference

```
#include <OpenThreads/Atomic>
```

Include dependency graph for Atomic.cpp:



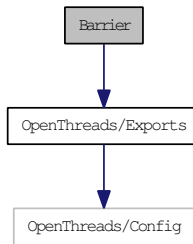
Namespaces

- namespace **OpenThreads**

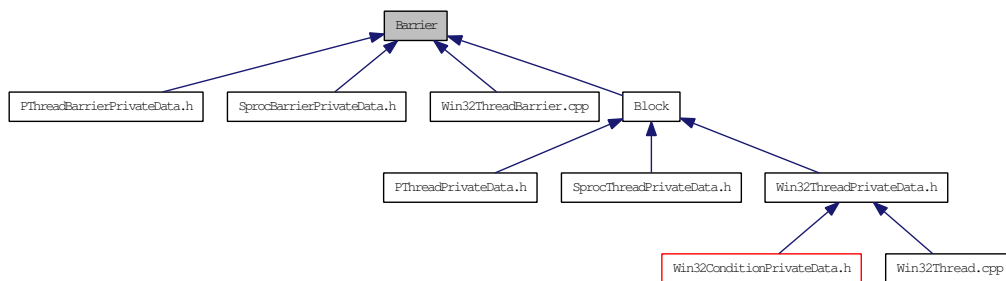
5.3 Barrier File Reference

```
#include <OpenThreads/Exports>
```

Include dependency graph for Barrier:



This graph shows which files directly or indirectly include this file:



Classes

- class **Barrier**
This class provides an object-oriented thread barrier interface.

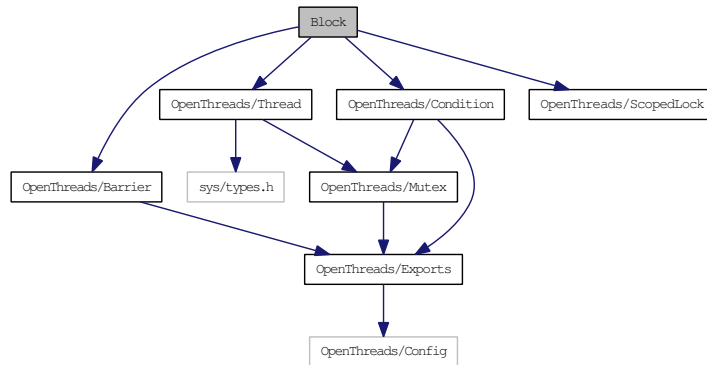
Namespaces

- namespace **OpenThreads**

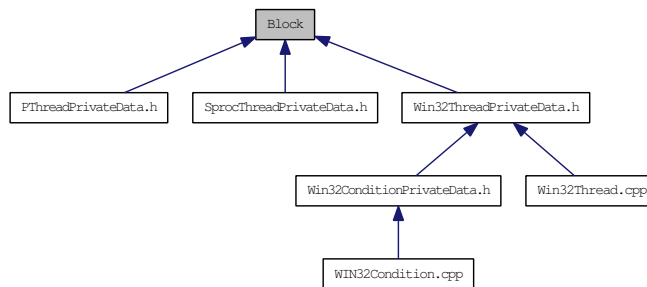
5.4 Block File Reference

```
#include <OpenThreads/Thread>
#include <OpenThreads/Barrier>
#include <OpenThreads/Condition>
#include <OpenThreads/ScopedLock>
```

Include dependency graph for Block:



This graph shows which files directly or indirectly include this file:



Classes

- class **Block**
Block (p. 18) is a block that can be used to halt a thread that is waiting another thread to release it.
- class **BlockCount**
BlockCount (p. 20) is a block that can be used to halt a thread that is waiting for a specified number of operations to be completed.

Namespaces

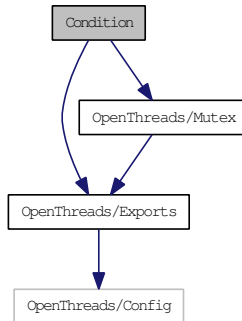
- namespace **OpenThreads**

5.5 Condition File Reference

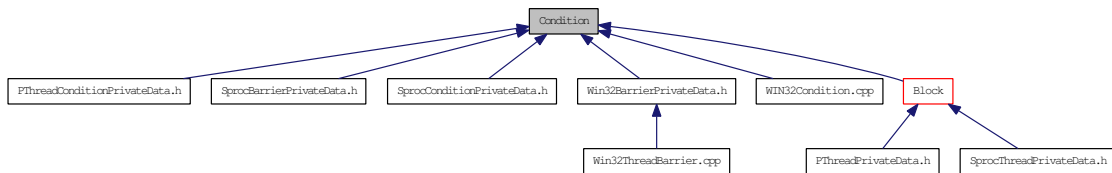
```
#include <OpenThreads/Exports>
```

```
#include <OpenThreads/Mutex>
```

Include dependency graph for Condition:



This graph shows which files directly or indirectly include this file:



Classes

- class **Condition**

This class provides an object-oriented thread condition interface.

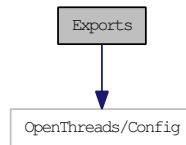
Namespaces

- namespace **OpenThreads**

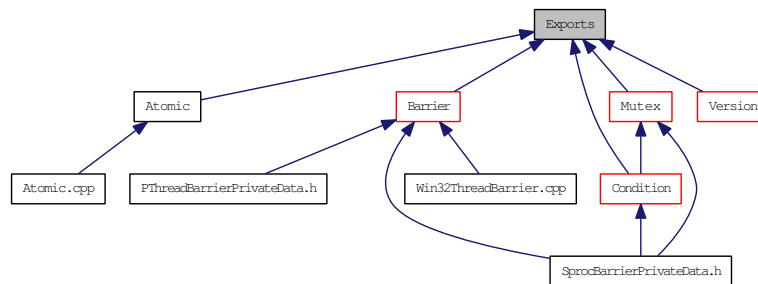
5.6 Exports File Reference

```
#include <OpenThreads/Config>
```

Include dependency graph for Exports:



This graph shows which files directly or indirectly include this file:



Defines

- #define **OPENTHREAD_EXPORT_DIRECTIVE**

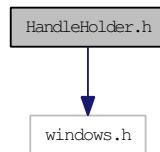
5.6.1 Define Documentation

5.6.1.1 #define **OPENTHREAD_EXPORT_DIRECTIVE**

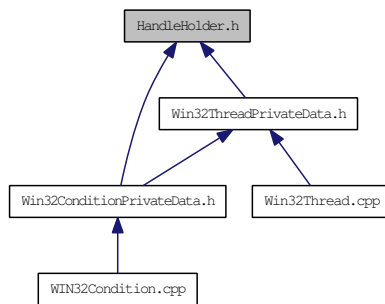
5.7 HandleHolder.h File Reference

```
#include <windows.h>
```

Include dependency graph for HandleHolder.h:



This graph shows which files directly or indirectly include this file:



Classes

- class **HandleHolder**

Namespaces

- namespace **OpenThreads**

Defines

- #define **WIN32_LEAN_AND_MEAN**

5.7.1 Define Documentation

5.7.1.1 #define WIN32_LEAN_AND_MEAN

5.8 mainpage.h File Reference

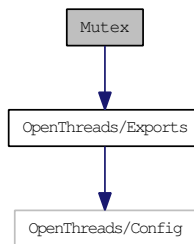
5.8.1 Detailed Description

This file contains doxygen special commands and text for the **Main Page** (p. ??) and some other minor aspects of this documentation. It is not part of **OpenThreads** (p. 11).

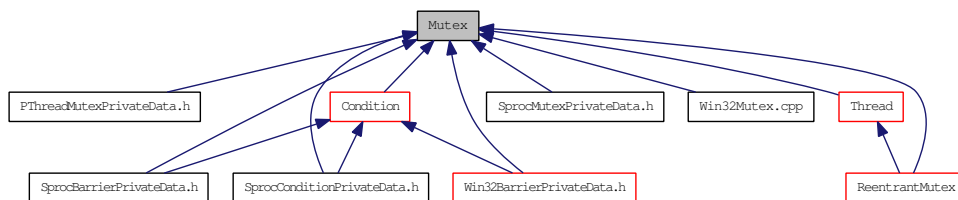
5.9 Mutex File Reference

```
#include <OpenThreads/Exports>
```

Include dependency graph for Mutex:



This graph shows which files directly or indirectly include this file:



Classes

- class **Mutex**
This class provides an object-oriented thread mutex interface.

Namespaces

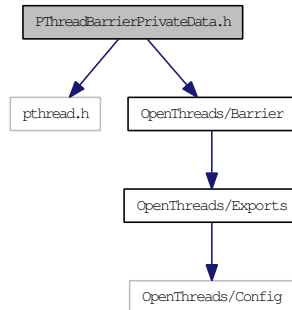
- namespace **OpenThreads**

5.10 PThreadBarrierPrivateData.h File Reference

```
#include <pthread.h>
```

```
#include <OpenThreads/Barrier>
```

Include dependency graph for PThreadBarrierPrivateData.h:



Classes

- class **PThreadBarrierPrivateData**

Namespaces

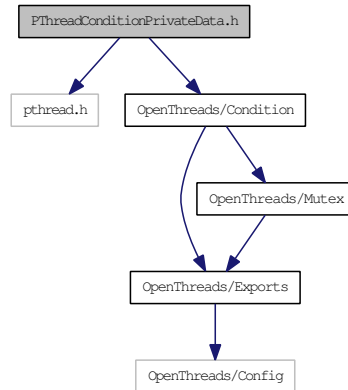
- namespace **OpenThreads**

5.11 PThreadConditionPrivateData.h File Reference

```
#include <pthread.h>
```

```
#include <OpenThreads/Condition>
```

Include dependency graph for PThreadConditionPrivateData.h:



Classes

- class **PThreadConditionPrivateData**

Namespaces

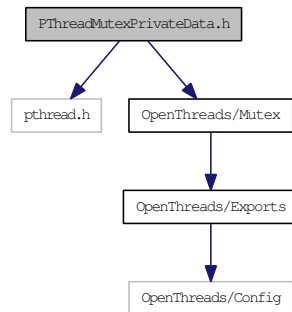
- namespace **OpenThreads**

5.12 PThreadMutexPrivateData.h File Reference

```
#include <pthread.h>
```

```
#include <OpenThreads/Mutex>
```

Include dependency graph for PThreadMutexPrivateData.h:



Classes

- class **PThreadMutexPrivateData**

Namespaces

- namespace **OpenThreads**

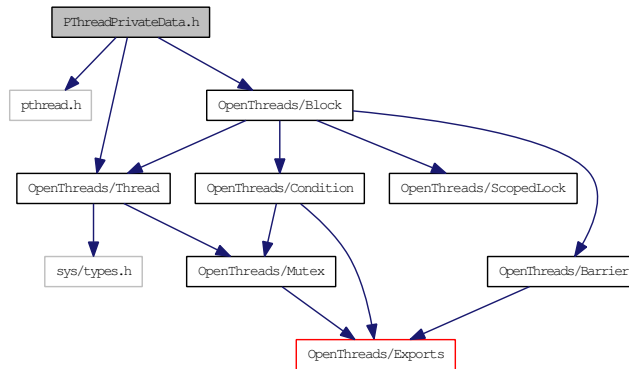
5.13 PThreadPrivateData.h File Reference

```
#include <pthread.h>
```

```
#include <OpenThreads/Thread>
```

```
#include <OpenThreads/Block>
```

Include dependency graph for PThreadPrivateData.h:



Classes

- class **PThreadPrivateData**

Namespaces

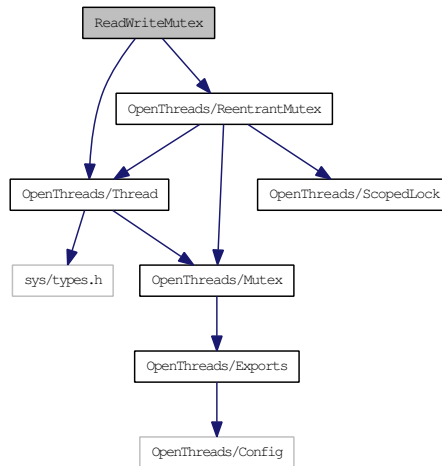
- namespace **OpenThreads**

5.14 ReadWriteMutex File Reference

```
#include <OpenThreads/Thread>
```

```
#include <OpenThreads/ReentrantMutex>
```

Include dependency graph for ReadWriteMutex:



Classes

- class **ReadWriteMutex**
- class **ScopedReadLock**
- class **ScopedWriteLock**

Namespaces

- namespace **OpenThreads**

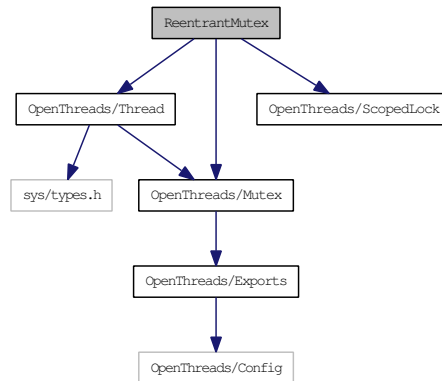
5.15 ReentrantMutex File Reference

```
#include <OpenThreads/Thread>
```

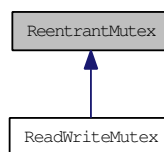
```
#include <OpenThreads/Mutex>
```

```
#include <OpenThreads/ScopedLock>
```

Include dependency graph for ReentrantMutex:



This graph shows which files directly or indirectly include this file:



Classes

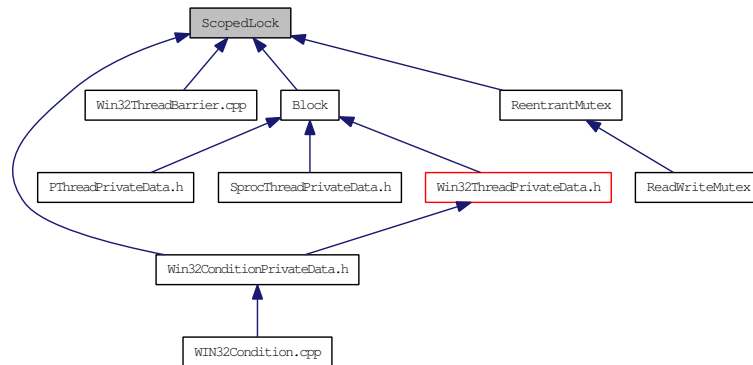
- class **ReentrantMutex**

Namespaces

- namespace **OpenThreads**

5.16 ScopedLock File Reference

This graph shows which files directly or indirectly include this file:



Classes

- class **ReverseScopedLock**< M >
- class **ReverseScopedPointerLock**< M >
- class **ScopedLock**< M >
- class **ScopedPointerLock**< M >

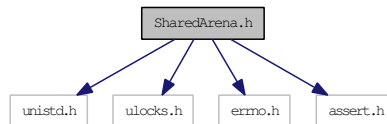
Namespaces

- namespace **OpenThreads**

5.17 SharedArena.h File Reference

```
#include <unistd.h>
#include <ulocks.h>
#include <errno.h>
#include <assert.h>
```

Include dependency graph for SharedArena.h:



Classes

- class **SharedArena**

Namespaces

- namespace **OpenThreads**

Defines

- #define **OT_USESHAREDONLY**

5.17.1 Define Documentation

5.17.1.1 #define OT_USESHAREDONLY

5.18 SprocBarrierPrivateData.h File Reference

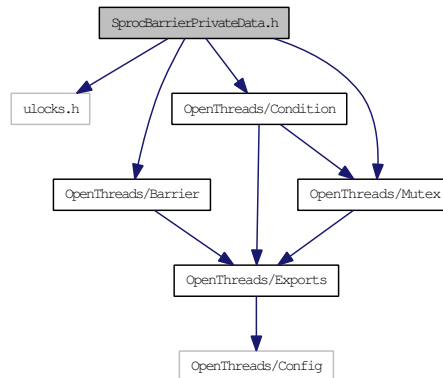
```
#include <ulocks.h>
```

```
#include <OpenThreads/Barrier>
```

```
#include <OpenThreads/Condition>
```

```
#include <OpenThreads/Mutex>
```

Include dependency graph for SprocBarrierPrivateData.h:



Classes

- class **SprocBarrierPrivateData**

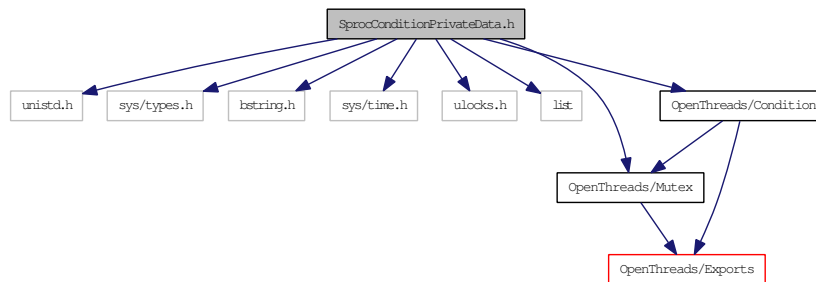
Namespaces

- namespace **OpenThreads**

5.19 SprocConditionPrivateData.h File Reference

```
#include <unistd.h>
#include <sys/types.h>
#include <bstring.h>
#include <sys/time.h>
#include <ulocks.h>
#include <list>
#include <OpenThreads/Mutex>
#include <OpenThreads/Condition>
```

Include dependency graph for SprocConditionPrivateData.h:



Classes

- class **SemaLink**
- class **SprocConditionPrivateData**

Namespaces

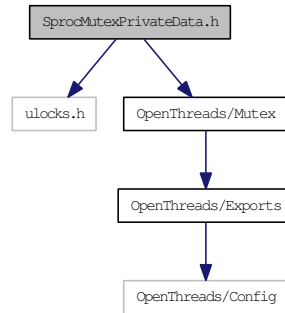
- namespace **OpenThreads**

5.20 SprocMutexPrivateData.h File Reference

```
#include <ulocks.h>
```

```
#include <OpenThreads/Mutex>
```

Include dependency graph for SprocMutexPrivateData.h:



Classes

- class **SprocMutexPrivateData**

Namespaces

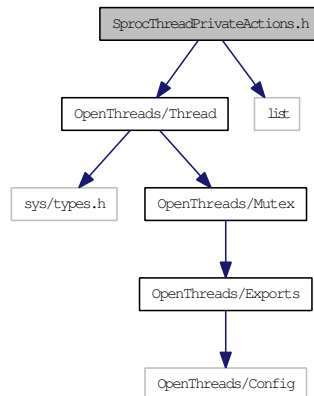
- namespace **OpenThreads**

5.21 SprocThreadPrivateActions.h File Reference

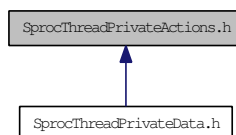
```
#include <OpenThreads/Thread>
```

```
#include <list>
```

Include dependency graph for SprocThreadPrivateActions.h:



This graph shows which files directly or indirectly include this file:



Classes

- class **ThreadPrivateActions**

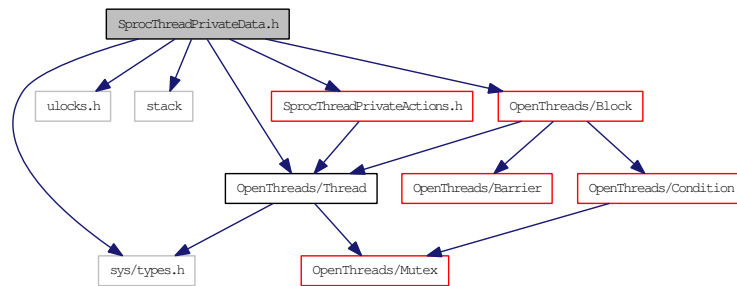
Namespaces

- namespace **OpenThreads**

5.22 SprocThreadPrivateData.h File Reference

```
#include <sys/types.h>
#include <ulocks.h>
#include <stack>
#include <OpenThreads/Thread>
#include <OpenThreads/Block>
#include "SprocThreadPrivateActions.h"
```

Include dependency graph for SprocThreadPrivateData.h:



Classes

- struct **CancelFuncStruct**
- class **SprocThreadPrivateData**

Namespaces

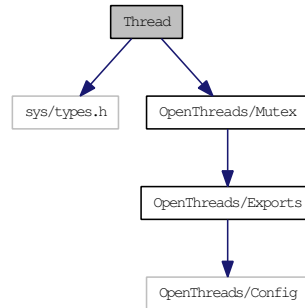
- namespace **OpenThreads**

5.23 Thread File Reference

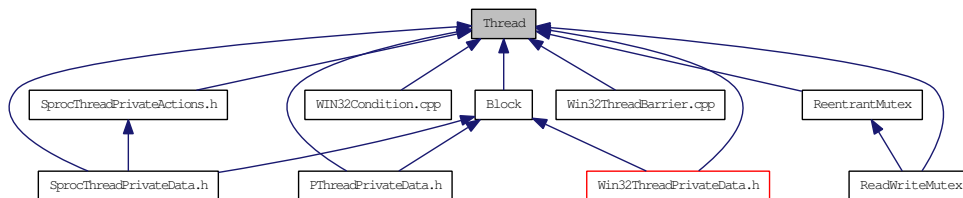
```
#include <sys/types.h>
```

```
#include <OpenThreads/Mutex>
```

Include dependency graph for Thread:



This graph shows which files directly or indirectly include this file:



Classes

- class **Thread**

This class provides an object-oriented thread interface.

Namespaces

- namespace **OpenThreads**

Functions

- OPENTHREAD_EXPORT_DIRECTIVE int **GetNumberOfProcessors** ()

Get the number of processors.

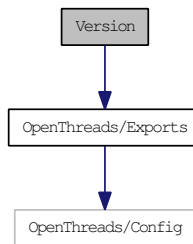
- OPENTHREAD_EXPORT_DIRECTIVE int **SetProcessorAffinityOfCurrentThread** (unsigned int cpunum)

Set the processor affinity of current thread.

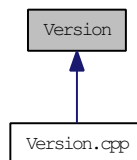
5.24 Version File Reference

```
#include <OpenThreads/Exports>
```

Include dependency graph for Version:



This graph shows which files directly or indirectly include this file:



Defines

- #define **OPENTHREADS_MAJOR_VERSION** 2
- #define **OPENTHREADS_MINOR_VERSION** 4
- #define **OPENTHREADS_PATCH_VERSION** 0
- #define **OPENTHREADS_SOVERSION** 11
- #define **OPENTHREADS_VERSION** 1

Functions

- OPENTHREAD_EXPORT_DIRECTIVE const char * **OpenThreadsGetLibraryName** ()
*The **OpenThreadsGetLibraryName()** (p. 86) method returns the library name in human-friendly form.*
- OPENTHREAD_EXPORT_DIRECTIVE const char * **OpenThreadsGetSOVersion** ()
*The **OpenThreadsGetSOVersion()** (p. 86) method returns the OpenSceneGraph soversion number.*
- OPENTHREAD_EXPORT_DIRECTIVE const char * **OpenThreadsGetVersion** ()
***OpenThreadsGetVersion()** (p. 86) returns the library version number.*

5.24.1 Define Documentation

5.24.1.1 #define **OPENTHREADS_MAJOR_VERSION** 2

5.24.1.2 #define **OPENTHREADS_MINOR_VERSION** 4

5.24.1.3 #define **OPENTHREADS_PATCH_VERSION** 0

5.24.1.4 #define **OPENTHREADS_SOVERSION** 11

5.24.1.5 #define **OPENTHREADS_VERSION** 1

5.24.2 Function Documentation

5.24.2.1 OPENTHREAD_EXPORT_DIRECTIVE const char* **OpenThreadsGetLibraryName** ()

The **OpenThreadsGetLibraryName()** (p. 86) method returns the library name in human-friendly form.

5.24.2.2 OPENTHREAD_EXPORT_DIRECTIVE const char* OpenThreadsGetSOVersion ()

The **OpenThreadsGetSOVersion()** (p. 86) method returns the OpenSceneGraph soversion number.

5.24.2.3 OPENTHREAD_EXPORT_DIRECTIVE const char* OpenThreadsGetVersion ()

OpenThreadsGetVersion() (p. 86) returns the library version number. Numbering convention : OpenThreads-1.0 will return 1.0 from OpenThreadsGetVersion.

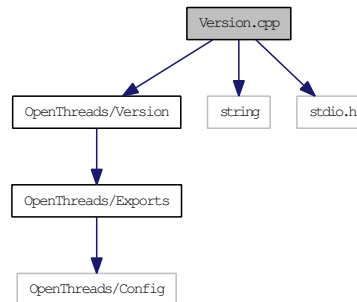
5.25 Version.cpp File Reference

```
#include <OpenThreads/Version>
```

```
#include <string>
```

```
#include <stdio.h>
```

Include dependency graph for Version.cpp:



Functions

- `const char * OpenThreadsGetLibraryName ()`
*The **OpenThreadsGetLibraryName()** (p. 86) method returns the library name in human-friendly form.*
- `const char * OpenThreadsGetSOVersion ()`
*The **OpenThreadsGetSOVersion()** (p. 86) method returns the OpenSceneGraph soversion number.*
- `const char * OpenThreadsGetVersion ()`
***OpenThreadsGetVersion()** (p. 86) returns the library version number.*

5.25.1 Function Documentation

5.25.1.1 `const char* OpenThreadsGetLibraryName ()`

The **OpenThreadsGetLibraryName()** (p. 86) method returns the library name in human-friendly form.

5.25.1.2 `const char* OpenThreadsGetSOVersion ()`

The **OpenThreadsGetSOVersion()** (p. 86) method returns the OpenSceneGraph soversion number.

5.25.1.3 `const char* OpenThreadsGetVersion ()`

OpenThreadsGetVersion() (p. 86) returns the library version number. Numbering convention : OpenThreads-1.0 will return 1.0 from **OpenThreadsGetVersion**.

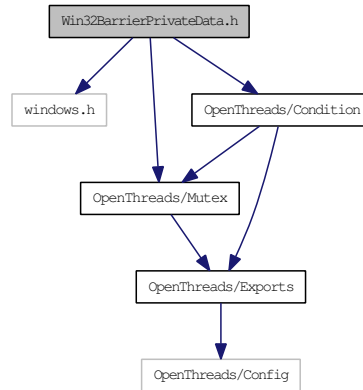
5.26 Win32BarrierPrivateData.h File Reference

```
#include <windows.h>
```

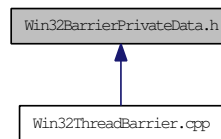
```
#include <OpenThreads/Mutex>
```

```
#include <OpenThreads/Condition>
```

Include dependency graph for Win32BarrierPrivateData.h:



This graph shows which files directly or indirectly include this file:



Classes

- class **Win32BarrierPrivateData**

Namespaces

- namespace **OpenThreads**

Defines

- #define **_WIN32_WINNT** 0x0400
- #define **WIN32_LEAN_AND_MEAN**

5.26.1 Define Documentation

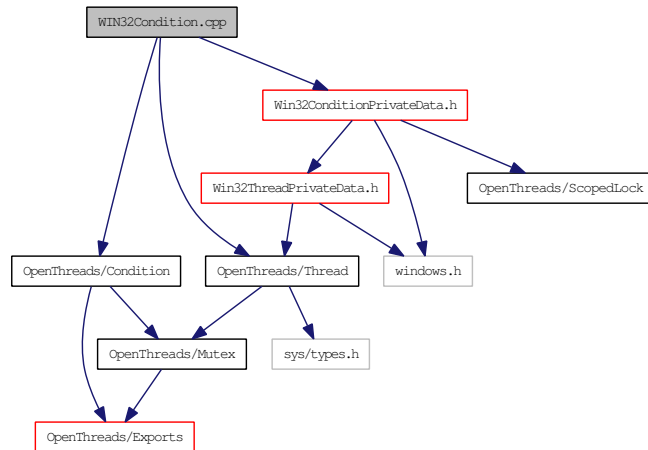
5.26.1.1 #define **_WIN32_WINNT** 0x0400

5.26.1.2 #define **WIN32_LEAN_AND_MEAN**

5.27 WIN32Condition.cpp File Reference

```
#include <OpenThreads/Condition>
#include <OpenThreads/Thread>
#include "Win32ConditionPrivateData.h"
```

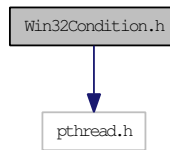
Include dependency graph for WIN32Condition.cpp:



5.28 Win32Condition.h File Reference

```
#include <pthread.h>
```

Include dependency graph for Win32Condition.h:



Classes

- class **Condition**

Namespaces

- namespace **Producer**

Defines

- #define **PRODUCER_CONDITION**

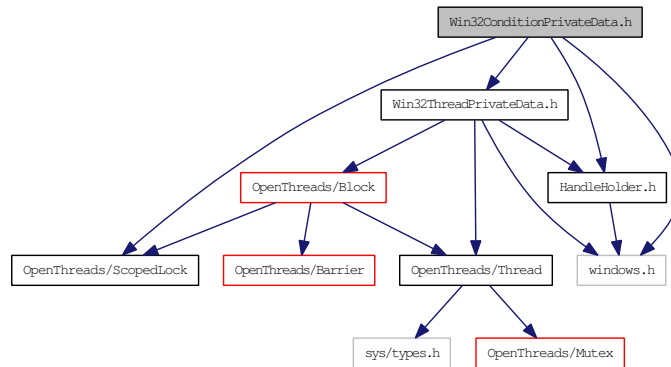
5.28.1 Define Documentation

5.28.1.1 #define PRODUCER_CONDITION

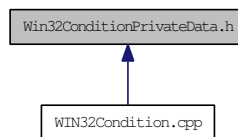
5.29 Win32ConditionPrivateData.h File Reference

```
#include <windows.h>
#include <OpenThreads/ScopedLock>
#include "Win32ThreadPrivateData.h"
#include "HandleHolder.h"
```

Include dependency graph for Win32ConditionPrivateData.h:



This graph shows which files directly or indirectly include this file:



Classes

- class **Win32ConditionPrivateData**

Namespaces

- namespace **OpenThreads**

Defines

- #define **_WIN32_WINNT** 0x0400
- #define **InterlockedGet(x)** InterlockedExchangeAdd(x,0)
- #define **WIN32_LEAN_AND_MEAN**

5.29.1 Define Documentation

5.29.1.1 #define **_WIN32_WINNT** 0x0400

5.29.1.2 #define **InterlockedGet(x)** InterlockedExchangeAdd(x,0)

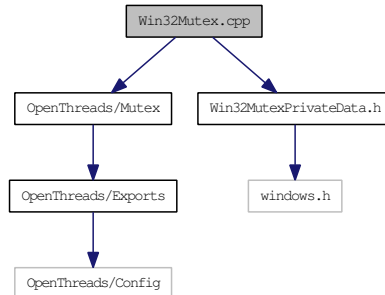
5.29.1.3 #define **WIN32_LEAN_AND_MEAN**

5.30 Win32Mutex.cpp File Reference

```
#include <OpenThreads/Mutex>
```

```
#include "Win32MutexPrivateData.h"
```

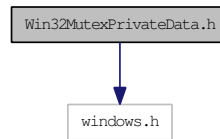
Include dependency graph for Win32Mutex.cpp:



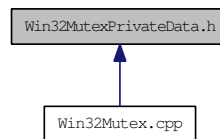
5.31 Win32MutexPrivateData.h File Reference

```
#include <windows.h>
```

Include dependency graph for Win32MutexPrivateData.h:



This graph shows which files directly or indirectly include this file:



Classes

- class **Win32MutexPrivateData**

Namespaces

- namespace **OpenThreads**

Defines

- #define **_WIN32_WINNT 0x0400**
- #define **USE_CRITICAL_SECTION**
- #define **WIN32_LEAN_AND_MEAN**

5.31.1 Define Documentation

5.31.1.1 #define **_WIN32_WINNT 0x0400**

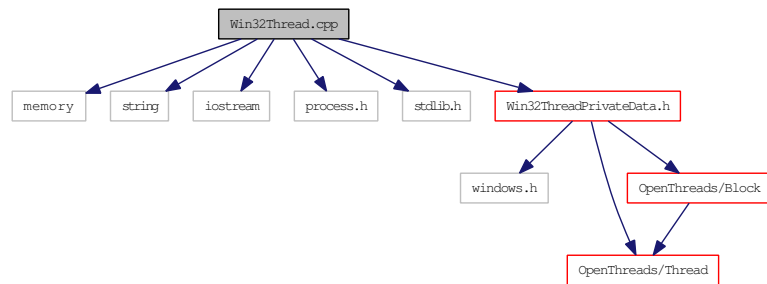
5.31.1.2 #define **USE_CRITICAL_SECTION**

5.31.1.3 #define **WIN32_LEAN_AND_MEAN**

5.32 Win32Thread.cpp File Reference

```
#include <memory>
#include <string>
#include <iostream>
#include <process.h>
#include <stdlib.h>
#include "Win32ThreadPrivateData.h"
```

Include dependency graph for Win32Thread.cpp:



Classes

- class **ThreadPrivateActions**
- struct **Win32ThreadCanceled**

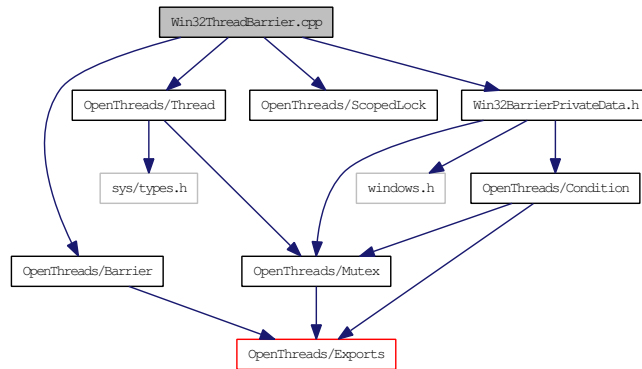
Namespaces

- namespace **OpenThreads**

5.33 Win32ThreadBarrier.cpp File Reference

```
#include <OpenThreads/Barrier>
#include <OpenThreads/Thread>
#include <OpenThreads/ScopedLock>
#include "Win32BarrierPrivateData.h"
```

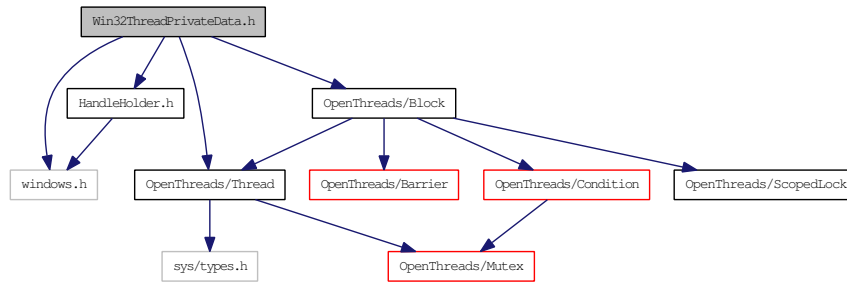
Include dependency graph for Win32ThreadBarrier.cpp:



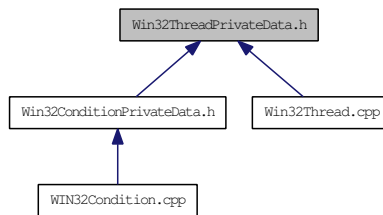
5.34 Win32ThreadPrivateData.h File Reference

```
#include <windows.h>
#include <OpenThreads/Thread>
#include <OpenThreads/Block>
#include "HandleHolder.h"
```

Include dependency graph for Win32ThreadPrivateData.h:



This graph shows which files directly or indirectly include this file:



Classes

- struct **TlsHolder**
- class **Win32ThreadPrivateData**

Namespaces

- namespace **OpenThreads**

Defines

- #define **_WIN32_WINNT** 0x0400
- #define **WIN32_LEAN_AND_MEAN**

Functions

- DWORD **cooperativeWait** (HANDLE waitHandle, unsigned long timeout)

5.34.1 Define Documentation

5.34.1.1 #define **_WIN32_WINNT** 0x0400

5.34.1.2 #define **WIN32_LEAN_AND_MEAN**

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