

# LIBMEAS

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# Chapter 1

## Directory Hierarchy

### 1.1 Directories

This directory hierarchy is sorted roughly, but not completely, alphabetically:

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# Chapter 2

## File Index

### 2.1 File List

Here is a list of all files with brief descriptions:

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## Chapter 3

# Directory Documentation

### 3.1 src/ Directory Reference

#### Files

- file [counter.c](#)
- file [init.c](#)
- file [linkedl.c](#)
- file [report.c](#)
- file [resources.c](#)
- file [time.c](#)



# Chapter 4

## File Documentation

### 4.1 src/counter.c File Reference

```
#include <meas.h>
#include <stdio.h>
#include <string.h>
#include <unistd.h>
#include <sys/syscall.h>
#include <errno.h>
```

#### Functions

- `meas_counter * meas_create_counter (meas_t **mst, unsigned long ivalue, char *name)`  
*Create a counter.*
- `unsigned long meas_set_counter (meas_counter *counter, unsigned long value)`  
*Set the value of a counter.*
- `unsigned long meas_get_counter (meas_counter counter)`  
*Return the value of a counter.*
- `unsigned long meas_inc_counter (meas_counter *counter)`  
*Increment the value of a counter.*
- `unsigned long meas_dec_counter (meas_counter *counter)`  
*Increment the value of a counter.*

#### 4.1.1 Function Documentation

**4.1.1.1** `meas_counter* meas_create_counter (meas_t ** mst, unsigned long ivalue, char * name)`

Create a counter.

**Parameters:**

*mst* The meas user structure.

*ivalue* Initial value.

*name* A name to the counter (useful for report visualization).

**Returns:**

NULL on error or the created counter.

**4.1.1.2 unsigned long meas\_dec\_counter (meas\_counter \* counter)**

Increment the value of a counter.

**Parameters:**

*counter* The counter

**Returns:**

unsigned long New value of the counter

**4.1.1.3 unsigned long meas\_get\_counter (meas\_counter counter)**

Return the value of a counter.

**Parameters:**

*counter* The counter

**Returns:**

unsigned long Value of the counter

**4.1.1.4 unsigned long meas\_inc\_counter (meas\_counter \* counter)**

Increment the value of a counter.

**Parameters:**

*counter* The counter

**Returns:**

unsigned long New value of the counter

**4.1.1.5 unsigned long meas\_set\_counter (meas\_counter \* counter, unsigned long value)**

Set the value of a counter.

Use ONLY for change initial value.

**Parameters:**

*counter* The counter

*value* Value of the counter

**Returns:**

unsigned long New value of the counter

## 4.2 src/init.c File Reference

```
#include <meas.h>
#include <stdlib.h>
```

### Functions

- [\\_\\_attribute\\_\\_](#) ((constructor))  
*Global constructor for libmeas internal allocation.*
- [\\_\\_attribute\\_\\_](#) ((destructor))  
*Global destructor for libmeas internal deallocation.*
- `int meas\_init (meas_t **mst)`  
*Initialize user structures for use libmeas API.*
- `void meas\_close (meas_t **mst)`  
*Destroy libmeas user structures.*

### 4.2.1 Function Documentation

#### 4.2.1.1 [\\_\\_attribute\\_\\_](#) ((destructor))

Global destructor for libmeas internal deallocation.

#### 4.2.1.2 [\\_\\_attribute\\_\\_](#) ((constructor))

Global constructor for libmeas internal allocation.

#### 4.2.1.3 `void meas\_close (meas_t ** mst)`

Destroy libmeas user structures.

#### Parameters:

*mst* The user libmeas structure

#### See also:

[meas\\_init](#)

#### 4.2.1.4 `int meas\_init (meas_t ** mst)`

Initialize user structures for use libmeas API.

#### Parameters:

*mst* The user libmeas structure

**Returns:**

int FALSE on error. True otherwise

**See also:**

[meas\\_close](#)

## 4.3 src/linkedl.c File Reference

```
#include <linkedl.h>
```

### Functions

- `int llist_create (llist **list)`  
*Linked list functions For libmeas internal use.*
- `int llist_destroy (llist **list)`  
*Destroy a linked list (remove all items).*
- `int llist_add (llist **list, void *element)`  
*Add item to the list.*
- `int llist_remove_nth (llist **list, unsigned int pos)`  
*Remove the nth item of the list.*
- `int llist_remove (llist **list, void *element)`  
*Remove an item from the list.*
- `void * llist_nth (llist *list, unsigned int index)`  
*Return the nth element of the list.*
- `int llist_index (llist *list, void *element)`  
*Return the index of some element list.*
- `int llist_length (llist *list)`  
*Return the number of items inside the list.*

### 4.3.1 Function Documentation

#### 4.3.1.1 `int llist_add (llist ** list, void * element)`

Add item to the list.

##### Parameters:

*list* Pointer to the list

*element* Any element (void pointer)

##### Returns:

FALSE on error. TRUE otherwise



#### 4.3.1.2 int llist\_create (llist \*\* *list*)

Linked list functions For libmeas internal use.

Create a empty linked list

**Parameters:**

*list* Pointer to list

**Returns:**

FALSE on error. TRUE otherwise

#### 4.3.1.3 int llist\_destroy (llist \*\* *list*)

Destroy a linked list (remove all items).

**Parameters:**

*list* Pointer to list

**Returns:**

FALSE on error. TRUE otherwise

#### 4.3.1.4 int llist\_index (llist \* *list*, void \* *element*)

Return the index of some element list.

**Parameters:**

*list* List

*element* Item

**Returns:**

Element index or -1 (if not found)

#### 4.3.1.5 int llist\_length (llist \* *list*)

Return the number of items inside the list.

**Parameters:**

*list* List

**Returns:**

The number of items

**4.3.1.6 void\* llist\_nth (llist \* *list*, unsigned int *index*)**

Return the nth element of the list.

**Parameters:**

*list* List

*index* Element position

**Returns:**

void\* Pointer to the element or NULL if not found

**4.3.1.7 int llist\_remove (llist \*\* *list*, void \* *element*)**

Remove an item from the list.

**Parameters:**

*list* Pointer to the list

*element* Pointer to the item to be removed

**Returns:**

FALSE on error. TRUE otherwise

**4.3.1.8 int llist\_remove\_nth (llist \*\* *list*, unsigned int *pos*)**

Remove the nth item of the list.

**Parameters:**

*list* Pointer to the list

*pos* Item position at the list

**Returns:**

FALSE on error. TRUE otherwise

## 4.4 src/report.c File Reference

```
#include <meas.h>
#include <stdio.h>
#include <string.h>
#include <time.h>
```

### Defines

- #define [TEXTBUFFER\\_SIZE](#) 1024  
*Size of text buffer.*

### Functions

- int [meas\\_generate\\_report](#) (meas\_t \*\*mst, int parameters)  
*Generate report information.*
- void [meas\\_write\\_report](#) (meas\_t \*mst, FILE \*fp)  
*Write report to file descriptor.*

#### 4.4.1 Define Documentation

##### 4.4.1.1 #define TEXTBUFFER\_SIZE 1024

Size of text buffer.

#### 4.4.2 Function Documentation

##### 4.4.2.1 int meas\_generate\_report (meas\_t \*\* mst, int parameters)

Generate report information.

NOTE1: The new report will replace any previous report generated. NOTE2: This function will just generate the report, use meas\_show\_report to print it.

#### Parameters:

*mst* The meas user structure.

*parameters* Parameters of report (REPORT\_TIMERS, REPORT\_COUNTERS or REPORT\_SHOW\_ALL).

#### Returns:

FALSE on error, TRUE otherwise.

#### 4.4.2.2 void meas\_write\_report (meas\_t \* *mst*, FILE \* *fp*)

Write report to file descriptor.

**Parameters:**

*mst* The meas user structure.

*fp* File descriptor pointer.

## 4.5 src/resources.c File Reference

```
#include <meas.h>
```

### Functions

- struct timeval \* [meas\\_get\\_untime](#) (meas\_t \*\*mst, int who)  
*Return the user time used.*
- struct timeval \* [meas\\_get\\_stime](#) (meas\_t \*\*mst, int who)  
*Return the system time used.*
- long [meas\\_get\\_shared\\_mem](#) (meas\_t \*\*mst, int who)  
*Return the integral shared memory size.*
- long [meas\\_get\\_datasec](#) (meas\_t \*\*mst, int who)  
*Return the integral (unshared) data section size.*
- long [meas\\_get\\_stack](#) (meas\_t \*\*mst, int who)  
*Return the integral (unshared) stack size.*
- long [meas\\_get\\_pagefault](#) (meas\_t \*\*mst, int who)  
*Return the number of page faults.*
- long [meas\\_get\\_nswap](#) (meas\_t \*\*mst, int who)  
*Return the number of pages swapped.*
- long [meas\\_get\\_nsignals](#) (meas\_t \*\*mst, int who)  
*Return the number of signals received.*
- long [meas\\_get\\_blkinput](#) (meas\_t \*\*mst, int who)  
*Return the number of block input operations.*
- long [meas\\_get\\_blkoutput](#) (meas\_t \*\*mst, int who)  
*Return the number of block output operations.*
- long [meas\\_get\\_cswitches](#) (meas\_t \*\*mst, int who)  
*Return the number context switches (voluntary + involuntary).*

### 4.5.1 Function Documentation

#### 4.5.1.1 long [meas\\_get\\_blkinput](#) (meas\_t \*\* mst, int who)

Return the number of block input operations.

#### Parameters:

*mst* The meas user structure.

*who* Can be: RUSAGE\_SELF (calling process), RUSAGE\_CHILDREN (all children) or RUSAGE\_THREAD (calling thread).

**Returns:**

long -1 on error or number of block input operations.

**4.5.1.2 long meas\_get\_blkoutput (meas\_t \*\* mst, int who)**

Return the number of block output operations.

**Parameters:**

*mst* The meas user structure.

*who* Can be: RUSAGE\_SELF (calling process), RUSAGE\_CHILDREN (all children) or RUSAGE\_THREAD (calling thread).

**Returns:**

long -1 on error or number of block output operations.

**4.5.1.3 long meas\_get\_cswitches (meas\_t \*\* mst, int who)**

Return the number context switches (voluntary + involuntary).

**Parameters:**

*mst* The meas user structure.

*who* Can be: RUSAGE\_SELF (calling process), RUSAGE\_CHILDREN (all children) or RUSAGE\_THREAD (calling thread).

**Returns:**

long -1 on error or number of total context switches.

**4.5.1.4 long meas\_get\_datasec (meas\_t \*\* mst, int who)**

Return the integral (unshared) data section size.

**Parameters:**

*mst* The meas user structure.

*who* Can be: RUSAGE\_SELF (calling process), RUSAGE\_CHILDREN (all children) or RUSAGE\_THREAD (calling thread).

**Returns:**

long -1 on error or integral (unshared) data section size.

**4.5.1.5 long meas\_get\_nsignals (meas\_t \*\* mst, int who)**

Return the number of signals received.

**Parameters:**

*mst* The meas user structure.

*who* Can be: RUSAGE\_SELF (calling process), RUSAGE\_CHILDREN (all children) or RUSAGE\_THREAD (calling thread).

**Returns:**

long -1 on error or number of signals received.

**4.5.1.6 long meas\_get\_nswap (meas\_t \*\* mst, int who)**

Return the number of pages swapped.

**Parameters:**

*mst* The meas user structure.

*who* Can be: RUSAGE\_SELF (calling process), RUSAGE\_CHILDREN (all children) or RUSAGE\_THREAD (calling thread).

**Returns:**

long -1 on error or number of pages swapped.

**4.5.1.7 long meas\_get\_pagefault (meas\_t \*\* mst, int who)**

Return the number of page faults.

**Parameters:**

*mst* The meas user structure.

*who* Can be: RUSAGE\_SELF (calling process), RUSAGE\_CHILDREN (all children) or RUSAGE\_THREAD (calling thread).

**Returns:**

long -1 on error or number of page faults.

**4.5.1.8 long meas\_get\_shared\_mem (meas\_t \*\* mst, int who)**

Return the integral shared memory size.

**Parameters:**

*mst* The meas user structure.

*who* Can be: RUSAGE\_SELF (calling process), RUSAGE\_CHILDREN (all children) or RUSAGE\_THREAD (calling thread).

**Returns:**

long -1 on error or integral shared memory size.

#### 4.5.1.9 long meas\_get\_stack (meas\_t \*\* *mst*, int *who*)

Return the integral (unshared) stack size.

**Parameters:**

*mst* The meas user structure.

*who* Can be: RUSAGE\_SELF (calling process), RUSAGE\_CHILDREN (all children) or RUSAGE\_THREAD (calling thread).

**Returns:**

long -1 on error or integral (unshared) stack size.

#### 4.5.1.10 struct timeval\* meas\_get\_stime (meas\_t \*\* *mst*, int *who*) [read]

Return the system time used.

**Parameters:**

*mst* The meas user structure.

*who* Can be: RUSAGE\_SELF (calling process), RUSAGE\_CHILDREN (all children) or RUSAGE\_THREAD (calling thread).

**Returns:**

struct timeval NULL on error or amount of time that this process has been scheduled in kernel mode, measured in clock ticks (divide by sysconf(\_SC\_CLK\_TCK).

#### 4.5.1.11 struct timeval\* meas\_get\_utime (meas\_t \*\* *mst*, int *who*) [read]

Return the user time used.

**Parameters:**

*mst* The meas user structure.

*who* Can be: RUSAGE\_SELF (calling process), RUSAGE\_CHILDREN (all children) or RUSAGE\_THREAD (calling thread).

**Returns:**

struct timeval NULL on error or amount of time that this process has been scheduled in user mode, measured in clock ticks (divide by sysconf(\_SC\_CLK\_TCK).



## 4.6 src/time.c File Reference

```
#include <meas.h>
#include <stdio.h>
#include <string.h>
#include <unistd.h>
#include <sys/syscall.h>
#include <errno.h>
```

### Defines

- `#define SYS_getjiffies 337`  
*syscall getjiffies number*

### Functions

- `meas_clock * meas_start_clock (meas_t **mst, meas_clock *clock, char *name)`  
*Start or/and create a timer.*
- `int meas_stop_clock (meas_clock *clock)`  
*Stop a timer.*

### 4.6.1 Define Documentation

#### 4.6.1.1 #define SYS\_getjiffies 337

syscall getjiffies number

### 4.6.2 Function Documentation

#### 4.6.2.1 `meas_clock* meas_start_clock (meas_t ** mst, meas_clock * clock, char * name)`

Start or/and create a timer.

##### Parameters:

- mst** The meas user structure. This argument is necessary only in the first call to create the clock (second argument will be NULL). After that, you can just pass NULL to mst and pass the clock in second argument.
- clock** The clock created with this function. Use NULL in the first call.
- name** A name to the clock (useful for report visualization).

##### Returns:

NULL if both mst and clock are different of NULL or the created clock.

**4.6.2.2 int meas\_stop\_clock (meas\_clock \* *clock*)**

Stop a timer.

**Parameters:**

*clock* The timer

**Returns:**

TRUE if the timer was stopped or FALSE if the timer was already stopped.

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