BigHybrid - BitDew-MapReduce Module

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Contents

Chapter 1

Data Structure Index

1.1 Data Structures

Here are the data structures with brief descriptions:

Chapter 2

File Index

2.1 File List

Here is a list of all files with brief descriptions:

Chapter 3

Data Structure Documentation

3.1 config_s Struct Reference

```
#include <common-mra.h>
```

Data Fields

- double mra_chunk_size
- double grid_average_speed
- double grid_cpu_power
- int mra_chunk_count
- int mra_chunk_replicas
- int mra_heartbeat_interval
- int amount_of_tasks_mra [2]
- int mra_number_of_workers
- int slots_mra [2]
- int initialized
- msg_host_t ∗ workers_mra

3.1.1 Field Documentation

3.1.1.1 int config_s::amount_of_tasks_mra[2]

3.1.1.2 double config_s::grid_average_speed

3.1.1.3 double config_s::grid_cpu_power

3.1.1.4 int config_s::initialized

3.1.1.5 int config_s::mra_chunk_count

3.1.1.6 int config_s::mra_chunk_replicas

3.1.1.7 double config_s::mra_chunk_size

3.1.1.8 int config_s::mra_heartbeat_interval

3.1.1.9 int config_s::mra_number_of_workers

3.1.1.10 int config_s::slots_mra[2]

3.1.1.11 msg_host_t∗ config_s::workers_mra

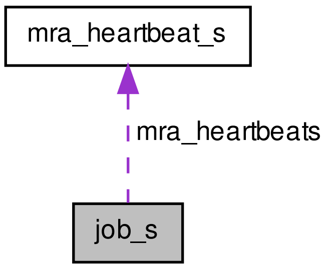
The documentation for this struct was generated from the following file:

- include/common-mra.h

3.2 job_s Struct Reference

```
#include <common-mra.h>
```

Collaboration diagram for job_s:



Data Fields

- int finished
- int tasks_pending [2]
- int ∗ task_instances [2]
- int ∗ task_status [2]
- msg_task_t ∗∗ task_list [2]
- size_t ∗∗ map_output
- mra_heartbeat_t mra_heartbeats

3.2.1 Field Documentation

3.2.1.1 int **job_s::finished**

3.2.1.2 size_t** **job_s::map_output**

3.2.1.3 **mra_heartbeat_t job_s::mra_heartbeats**

3.2.1.4 int* **job_s::task_instances**[2]

3.2.1.5 msg_task_t** **job_s::task_list**[2]

3.2.1.6 int* **job_s::task_status**[2]

3.2.1.7 int **job_s::tasks_pending**[2]

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

- include/common-mra.h

3.3 mra_heartbeat_s Struct Reference

Information sent by the workers with every heartbeat.

`#include <common-mra.h>`

Data Fields

- int slots_av [2]

3.3.1 Detailed Description

Information sent by the workers with every heartbeat.

3.3.2 Field Documentation

3.3.2.1 int **mra_heartbeat_s::slots_av**[2]

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

- include/common-mra.h

3.4 stats_s Struct Reference

```
#include <common-mra.h>
```

Data Fields

- int map_local
- int mra_map_remote
- int map_spec_l
- int map_spec_r
- int reduce_normal
- int reduce_spec

3.4.1 Field Documentation

3.4.1.1 int **stats_s::map_local**

3.4.1.2 int **stats_s::map_spec_l**

3.4.1.3 int **stats_s::map_spec_r**

3.4.1.4 int **stats_s::mra_map_remote**

3.4.1.5 int **stats_s::reduce_normal**

3.4.1.6 int **stats_s::reduce_spec**

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

- include/common-mra.h

3.5 task_info_s Struct Reference

Information sent as the task data.

```
#include <common-mra.h>
```

Data Fields

- enum phase_e phase
- size_t id
- size_t src
- size_t wid
- int pid

- msg_task_t task
- size_t ∗ map_output_copied
- double shuffle_mra_end

3.5.1 Detailed Description

Information sent as the task data.

3.5.2 Field Documentation

3.5.2.1 size_t task_info_s::id

3.5.2.2 size_t∗ task_info_s::map_output_copied

3.5.2.3 enum phase_e task_info_s::phase

3.5.2.4 int task_info_s::pid

3.5.2.5 double task_info_s::shuffle_mra_end

3.5.2.6 size_t task_info_s::src

3.5.2.7 msg_task_t task_info_s::task

3.5.2.8 size_t task_info_s::wid

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

- include/common-mra.h

3.6 user_s Struct Reference

```
#include <common-mra.h>
```

Data Fields

- double(∗ task_mra_cost_f)(enum phase_e phase, size_t tid, size_t wid)
- void(∗ mra_dfs_f)(char ∗∗mra_dfs_matrix, size_t chunks, size_t workers_mra, int replicas)
- int(∗ map_mra_output_f)(size_t mid, size_t rid)

3.6.1 Field Documentation

3.6.1.1 int(∗ user_s::map_mra_output_f)(size_t mid, size_t rid)

3.6.1.2 void(∗ user_s::mra_dfs_f)(char ∗∗mra_dfs_matrix, size_t chunks, size_t workers_mra, int replicas)

3.6.1.3 double(∗ user_s::task_mra_cost_f)(enum phase_e phase, size_t tid, size_t wid)

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

- include/common-mra.h

3.7 w_info_s Struct Reference

```
#include <worker-mra.h>
```

Data Fields

- size_t wid

3.7.1 Field Documentation

3.7.1.1 size_t w_info_s::wid

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

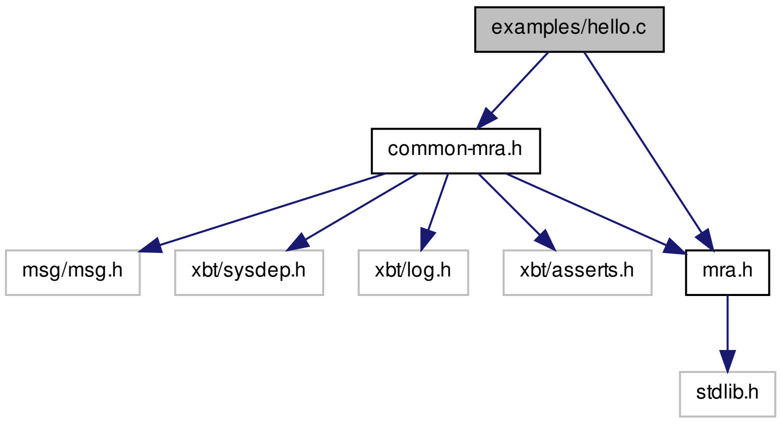
- include/worker-mra.h

Chapter 4

File Documentation

4.1 examples/hello.c File Reference

`#include "common-mra.h"` `#include <mra.h>` Include dependency graph for hello.c:



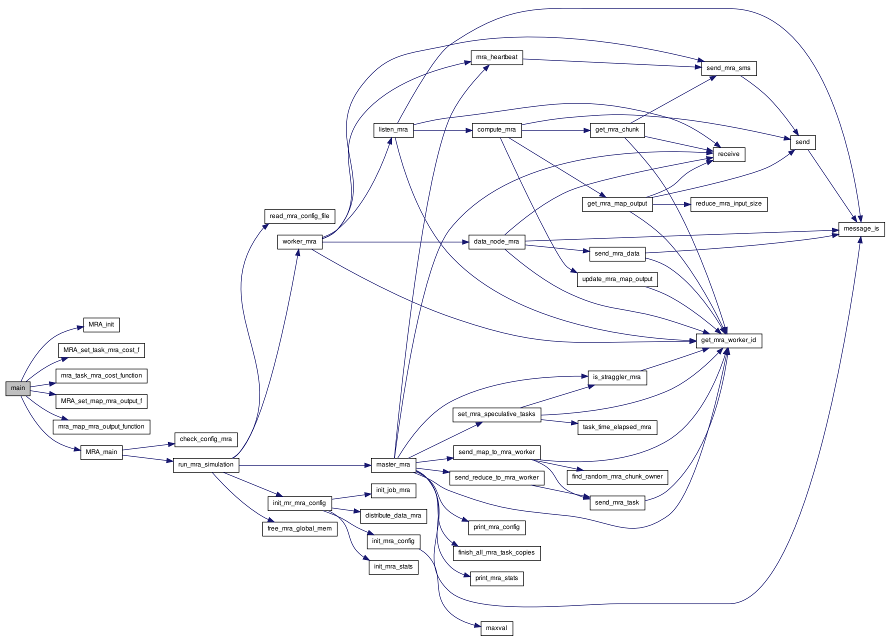
Functions

- static void read_mra_config_file (const char ∗file_name)
- int mra_map_mra_output_function (size_t mid, size_t rid)
- double mra_task_mra_cost_function (enum phase_e phase, size_t tid, size_t wid)
- int main (int argc, char ∗argv[])

4.1.1 Function Documentation

4.1.1.1 int **main** (int *argc,* char ∗ *argv[]*)

Here is the call graph for this function:



4.1.1.2 int **mra_map_mra_output_function** (size_t *mid,* size_t *rid*)

User function that indicates the amount of bytes that a map task will emit to a reduce task.

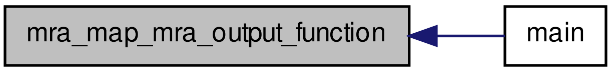
Parameters

mid	The ID of the map task.
rid	The ID of the reduce task.

Returns

The amount of data emitted (in bytes).

Here is the caller graph for this function:



4.1.1.3 double **mra_task_mra_cost_function** (enum **phase_e** *phase,* size_t *tid,* size_t *wid*)

User function that indicates the cost of a task.

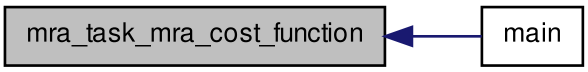
Parameters

phase	The execution phase.
tid	The ID of the task.
wid	The ID of the worker that received the task.

Returns

The task cost in FLOPs.

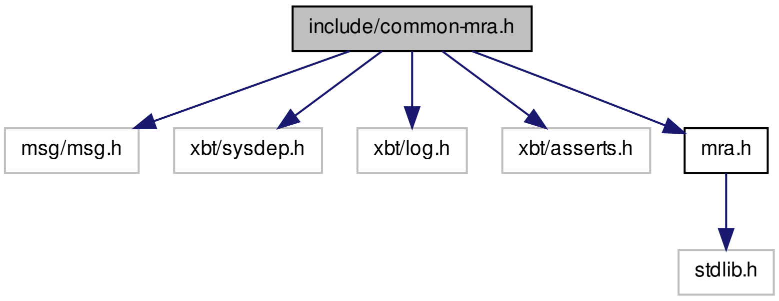
Here is the caller graph for this function:



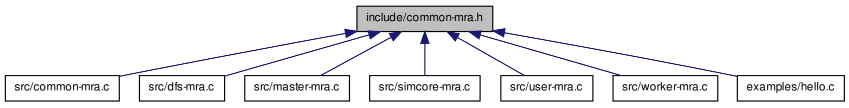
4.1.1.4 static void **read_mra_config_file** (const char ∗ *file_name*) [static]

4.2 include/common-mra.h File Reference

`#include <msg/msg.h> #include <xbt/sysdep.h> #include <xbt/log.h> #include <xbt/asserts.h> #include "mra.h"` ×
Include dependency graph for common-mra.h:



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



Data Structures

- struct mra_heartbeat_s

  Information sent by the workers with every heartbeat.
- struct config_s
- struct job_s
- struct task_info_s

  Information sent as the task data.
- struct stats_s
- struct user_s

Defines

- #define MRA_HEARTBEAT_MIN_INTERVAL 3

- #define MRA_HEARTBEAT_TIMEOUT 600
- #define SMS_GET_MRA_CHUNK "SMS-GC"
- #define SMS_GET_INTER_PAIRS "SMS-GIP"
- #define SMS_MRA_HEARTBEAT "SMS-HB"
- #define SMS_TASK "SMS-T"
- #define SMS_TASK_DONE "SMS-TD"
- #define SMS_FINISH "SMS-F"
- #define NONE (-1)
- #define MAX_SPECULATIVE_COPIES 3
- #define MAILBOX_ALIAS_SIZE 256
- #define MASTER_MRA_MAILBOX "MASTER_MRA"
- #define DATANODE_MRA_MAILBOX "%zu:DN"
- #define TASKTRACKER_MRA_MAILBOX "%zu:TT"
- #define TASK_MRA_MAILBOX "%zu:%d"

Typedefs

- typedef struct mra_heartbeat_s ∗ mra_heartbeat_t
- typedef struct task_info_s ∗ mra_task_info_t

Enumerations

- enum task_status_e { T_STATUS_MRA_PENDING, T_STATUS_MRA_TIP, T_-STATUS_MRA_TIP_SLOW, T_STATUS_MRA_DONE }

  Possible task status.

Functions

- msg_error_t send (const char ∗str, double cpu, double net, void ∗data, const char ∗mailbox)

  Send a message/task.
- msg_error_t send_mra_sms (const char ∗str, const char ∗mailbox)

  Send a short message, of size zero.
- msg_error_t receive (msg_task_t ∗msg, const char ∗mailbox)

  Receive a message/task from a mailbox.
- int message_is (msg_task_t msg, const char ∗str)

  Compare the message from a task with a string.
- int maxval (int a, int b)

  Return the maximum of two values.
- size_t map_mra_output_size (size_t mid)

  Return the output size of a map task.
- size_t reduce_mra_input_size (size_t rid)

  Return the input size of a reduce task.

Variables

- int ∗ dist_bruta

  Initialize dist_bruta, task_exec, avg_task_exec.
- double ∗ task_exec
- double ∗ avg_task_exec_map
- double ∗ avg_task_exec_reduce
- int Fg
- int mra_perc
- struct config_s config_mra
- struct job_s job_mra
- struct stats_s stats_mra
- struct user_s user_mra

4.2.1 Define Documentation

4.2.1.1 #define DATANODE_MRA_MAILBOX "%zu:DN"

4.2.1.2 #define MAILBOX_ALIAS_SIZE 256

4.2.1.3 #define MASTER_MRA_MAILBOX "MASTER_MRA"

4.2.1.4 #define MAX_SPECULATIVE_COPIES 3

4.2.1.5 #define MRA_HEARTBEAT_MIN_INTERVAL 3

4.2.1.6 #define MRA_HEARTBEAT_TIMEOUT 600

4.2.1.7 #define NONE (-1)

4.2.1.8 #define SMS_FINISH "SMS-F"

4.2.1.9 #define SMS_GET_INTER_PAIRS "SMS-GIP"

4.2.1.10 #define SMS_GET_MRA_CHUNK "SMS-GC"

4.2.1.11 #define SMS_MRA_HEARTBEAT "SMS-HB"

4.2.1.12 #define SMS_TASK "SMS-T"

4.2.1.13 #define SMS_TASK_DONE "SMS-TD"

4.2.1.14 #define TASK_MRA_MAILBOX "%zu:%d"

4.2.1.15 #define TASKTRACKER_MRA_MAILBOX "%zu:TT"

4.2.2 Typedef Documentation

4.2.2.1 typedef struct **mra_heartbeat_s**∗ **mra_heartbeat_t**

4.2.2.2 typedef struct **task_info_s**∗ **mra_task_info_t**

4.2.3 Enumeration Type Documentation

4.2.3.1 enum **task_status_e**

Possible task status.

Enumerator:

T_STATUS_MRA_PENDING

T_STATUS_MRA_TIP

T_STATUS_MRA_TIP_SLOW

T_STATUS_MRA_DONE

4.2.4 Function Documentation

4.2.4.1 size_t **map_mra_output_size** (size_t *mid*)

Return the output size of a map task.

Parameters

mid	The map task ID.

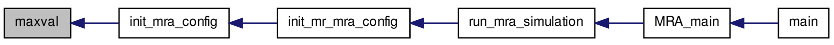
Returns

The task output size in bytes.

4.2.4.2 int **maxval** (int *a*, int *b*)

Return the maximum of two values.

Here is the caller graph for this function:



4.2.4.3 int **message_is** (msg_task_t *msg*, const char ∗ *str*)

Compare the message from a task with a string.

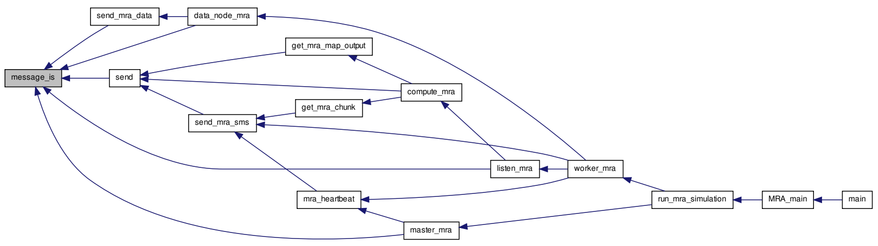
Parameters

msg	The message/task.
str	The string to compare with.

Returns

A positive value if matches, zero if doesn't.

Here is the caller graph for this function:



4.2.4.4 msg_error_t **receive** (msg_task_t ∗ *msg*, const char ∗ *mailbox*)

Receive a message/task from a mailbox.

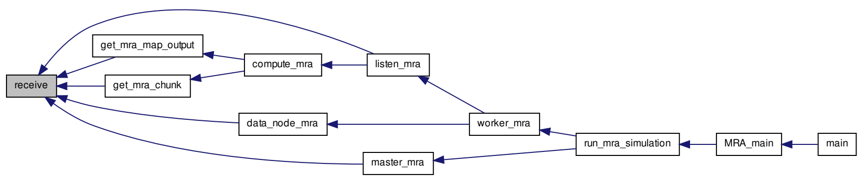
Parameters

msg	Where to store the received message.
mailbox	The mailbox alias.

Returns

The status of the transfer.

Here is the caller graph for this function:



4.2.4.5 size_t reduce_mra_input_size (size_t *rid*)

Return the input size of a reduce task.

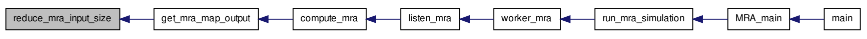
Parameters

rid	The reduce task ID.

Returns

The task input size in bytes.

Here is the caller graph for this function:



4.2.4.6 msg_error_t send (const char ∗ *str,* double *cpu,* double *net,* void ∗ *data,* const char ∗ *mailbox*)

Send a message/task.

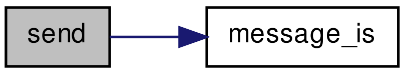
Parameters

str	The message.
cpu	The amount of cpu required by the task.
net	The message size in bytes.
data	Any data to attatch to the message.
mailbox	The destination mailbox alias.

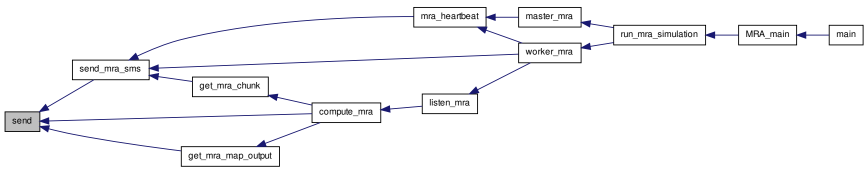
Returns

The MSG status of the operation.

Here is the call graph for this function:



Here is the caller graph for this function:



4.2.4.7 msg_error_t **send_mra_sms** (const char ∗ *str,* const char ∗ *mailbox*)

Send a short message, of size zero.

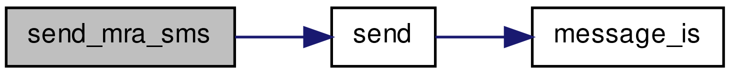
Parameters

str	The message.
mailbox	The destination mailbox alias.

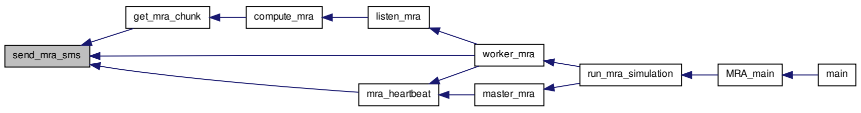
Returns

The MSG status of the operation.

Here is the call graph for this function:



Here is the caller graph for this function:



4.2.5 Variable Documentation

4.2.5.1 double∗ **avg_task_exec_map**

4.2.5.2 double∗ **avg_task_exec_reduce**

4.2.5.3 struct **config_s config_mra**

4.2.5.4 int∗ **dist_bruta**

Initialize dist_bruta, task_exec, avg_task_exec.

4.2.5.5 int **Fg**

4.2.5.6 struct **job_s job_mra**

4.2.5.7 int **mra_perc**

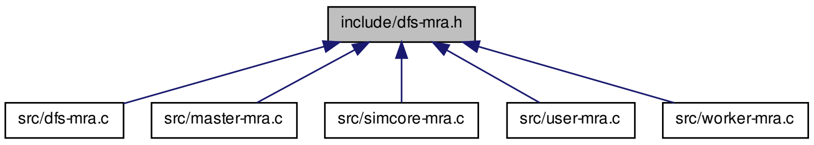
4.2.5.8 struct **stats_s stats_mra**

4.2.5.9 double∗ **task_exec**

4.2.5.10 struct user_s user_mra

4.3 include/dfs-mra.h File Reference

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



Functions

- void distribute_data_mra (void)

  Distribute chunks (and replicas) to DataNodes.
- void default_mra_dfs_f (char ∗∗mra_dfs_matrix, size_t chunks, size_t workers_-mra, int replicas)

  Default data distribution algorithm.
- size_t find_random_mra_chunk_owner (int cid)

  Choose a random DataNode that owns a specific chunk.
- int data_node_mra (int argc, char ∗argv[ ])

  DataNode main function.

Variables

- char ∗∗ chunk_owner_mra

  Matrix that maps chunks to workers.

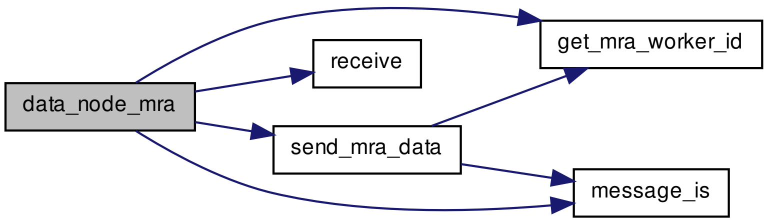
4.3.1 Function Documentation

4.3.1.1 int data_node_mra (int *argc,* char ∗ *argv[ ]*)

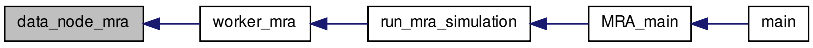
DataNode main function.

Process that listens for data requests.

Here is the call graph for this function:



Here is the caller graph for this function:



4.3.1.2 void **default_mra_dfs_f** (char ∗∗ *mra_dfs_matrix,* size_t *chunks,* size_t *workers_mra,* int *replicas*)

Default data distribution algorithm.

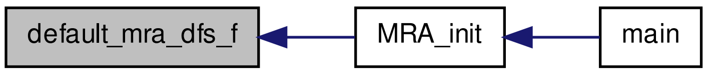
de workers --> workers_hosts[id] (array) capacidade --> MSG_get_host_speed (config_mra.workers[owner]) --> Calcula a capacidade computacional relativa de cada worker baseado na capacidade total da grid. --> É o array com as tribuições brutas, antes do ajuste de menor te_exec --> É o array com o valor de previsão de término de todas as tarefas distribuídas ao worker; --> É o array com o tempo que será utilizado para encontrar a melhor distribuição --> É o array que contém o tempo de cada worker para executar uma tarefa computacional padrão

config_mra.slots_mra[MRA_MAP];

--> verifica qual é o maior tempo de execução previsto

Ajuste de Força Bruta com uma Otimização Combinatória para obter uma distribuição de chunks com o menor tempo de execução possível

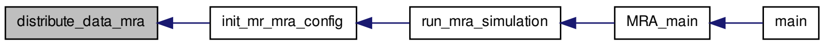
Here is the caller graph for this function:



4.3.1.3 void **distribute_data_mra** (void)

Distribute chunks (and replicas) to DataNodes.

Here is the caller graph for this function:



4.3.1.4 size_t **find_random_mra_chunk_owner** (int *cid*)

Choose a random DataNode that owns a specific chunk.

Parameters

cid	The chunk ID.

Returns

The ID of the DataNode.

Distribution of Data Replication

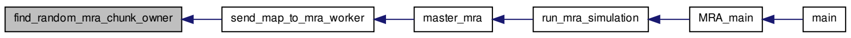
Parameters

cid	The chunk ID.

Returns

The ID of the DataNode.

Here is the caller graph for this function:



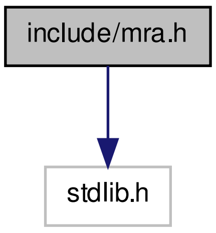
4.3.2 Variable Documentation

4.3.2.1 char** chunk_owner_mra

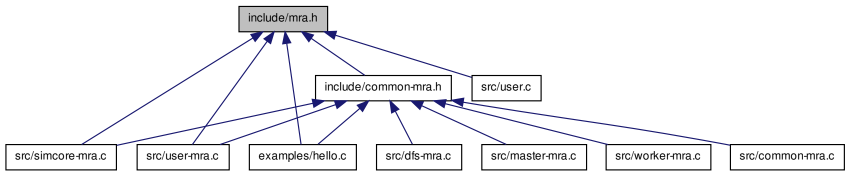
Matrix that maps chunks to workers.

4.4 include/mra.h File Reference

`#include <stdlib.h>` Include dependency graph for mra.h:



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



Enumerations

- enum phase_e { MRA_MAP, MRA_REDUCE }

  Possible execution phases.

Functions

- void MRA_init (void)
- int MRA_main (const char ∗plat, const char ∗depl, const char ∗conf)
- void MRA_set_task_mra_cost_f (double(∗f)(enum phase_e phase, size_t tid, size_t wid))
- void MRA_set_dfs_f (void(∗f)(char ∗∗mra_dfs_matrix, size_t chunks, size_t workers_mra, int replicas))
- void MRA_set_map_mra_output_f (int(∗f)(size_t mid, size_t rid))

4.4.1 Enumeration Type Documentation

4.4.1.1 enum phase_e

Possible execution phases.

Enumerator:

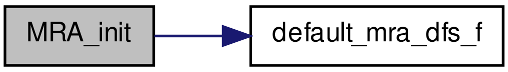
MRA_MAP

MRA_REDUCE

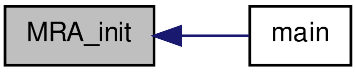
4.4.2 Function Documentation

4.4.2.1 void MRA_init (void)

Here is the call graph for this function:

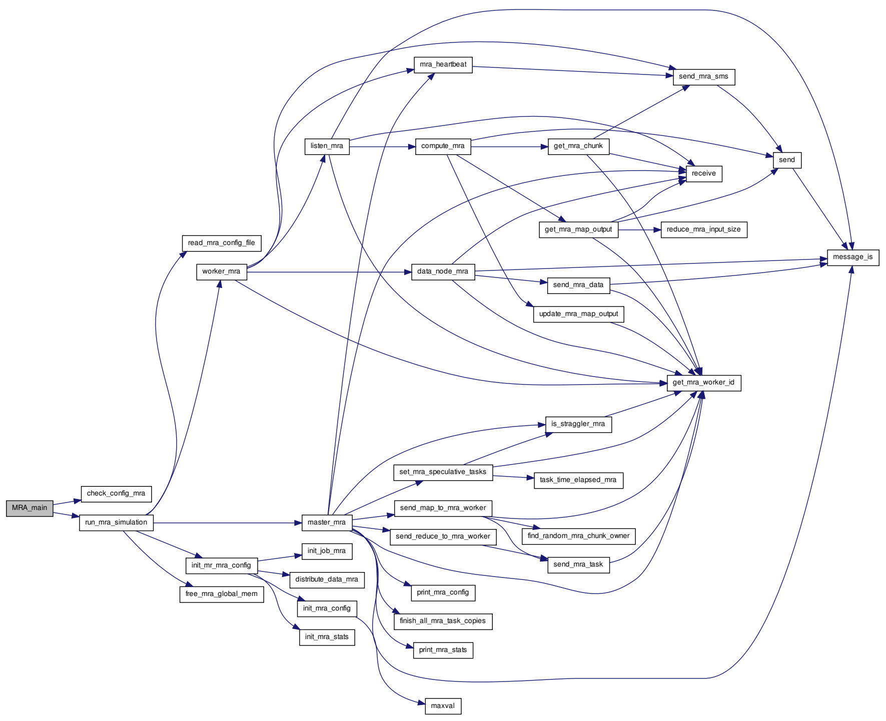


Here is the caller graph for this function:

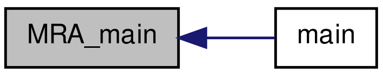


4.4.2.2 int MRA_main (const char ∗ *plat,* const char ∗ *depl,* const char ∗ *conf*)

Here is the call graph for this function:



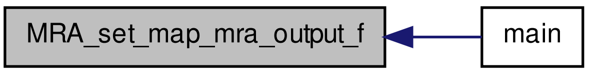
Here is the caller graph for this function:



4.4.2.3 void MRA_set_dfs_f (void(∗)(char ∗∗mra_dfs_matrix, size_t chunks, size_t workers_mra, int replicas) *f*)

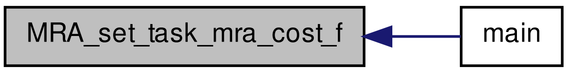
4.4.2.4 void **MRA_set_map_mra_output_f** (int(∗)(size_t mid, size_t rid) *f*)

Here is the caller graph for this function:



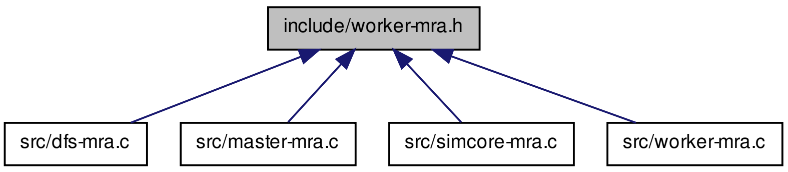
4.4.2.5 void **MRA_set_task_mra_cost_f** (double(∗)(enum **phase_e** phase, size_t tid, size_t wid) *f*)

Here is the caller graph for this function:



4.5 include/worker-mra.h File Reference

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



Data Structures

- struct w_info_s

Defines

- #define MAXIMUM_WORKER_FAILURES 4

Typedefs

- typedef struct w_info_s ∗ w_mra_info_t

Functions

- size_t get_mra_worker_id (msg_host_t worker)

  Get the ID of a worker.

4.5.1 Define Documentation

4.5.1.1 #define MAXIMUM_WORKER_FAILURES 4

4.5.2 Typedef Documentation

4.5.2.1 typedef struct w_info_s∗ w_mra_info_t

4.5.3 Function Documentation

4.5.3.1 size_t get_mra_worker_id (msg_host_t *worker*)

Get the ID of a worker.

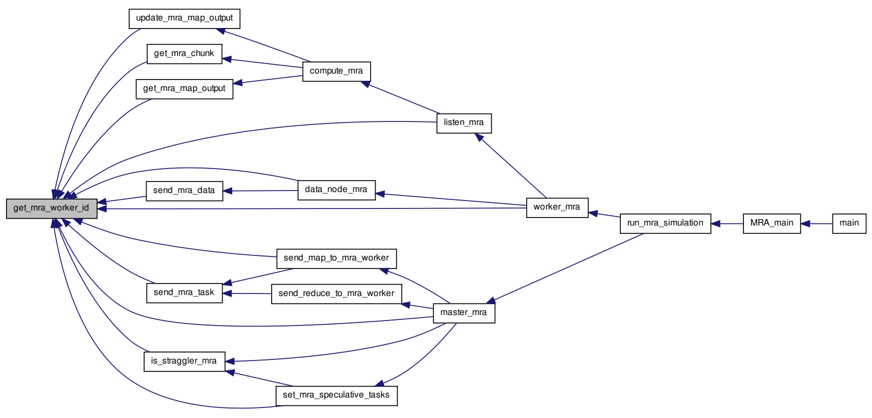
Parameters

worker	The worker node.

Returns

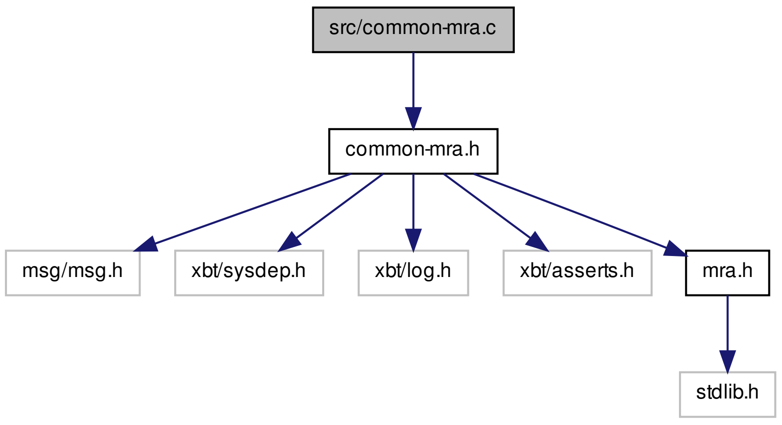
The worker's ID number.

Here is the caller graph for this function:



4.6 src/common-mra.c File Reference

`#include "common-mra.h"` Include dependency graph for common-mra.c:



Functions

- XBT_LOG_EXTERNAL_DEFAULT_CATEGORY (msg_test)
- msg_error_t send (const char ∗str, double cpu, double net, void ∗data, const char ∗mailbox)

  Send a message/task.
- msg_error_t send_mra_sms (const char ∗str, const char ∗mailbox)

  Send a short message, of size zero.
- msg_error_t receive (msg_task_t ∗msg, const char ∗mailbox)

  Receive a message/task from a mailbox.
- int message_is (msg_task_t msg, const char ∗str)

  Compare the message from a task with a string.
- int maxval (int a, int b)

  Return the maximum of two values.
- size_t map_mra_output_size (size_t mid)

  Return the output size of a map task.
- size_t reduce_mra_input_size (size_t rid)

  Return the input size of a reduce task.

4.6.1 Function Documentation

4.6.1.1 size_t map_mra_output_size (size_t *mid*)

Return the output size of a map task.

Parameters

mid	The map task ID.

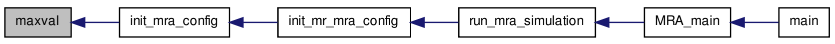
Returns

The task output size in bytes.

4.6.1.2 int maxval (int *a,* int *b*)

Return the maximum of two values.

Here is the caller graph for this function:



4.6.1.3 int **message_is** (msg_task_t *msg*, const char ∗ *str*)

Compare the message from a task with a string.

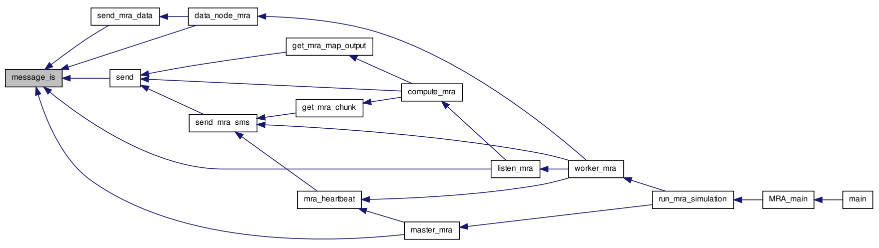
Parameters

msg	The message/task.
str	The string to compare with.

Returns

A positive value if matches, zero if doesn't.

Here is the caller graph for this function:



4.6.1.4 msg_error_t **receive** (msg_task_t ∗ *msg*, const char ∗ *mailbox*)

Receive a message/task from a mailbox.

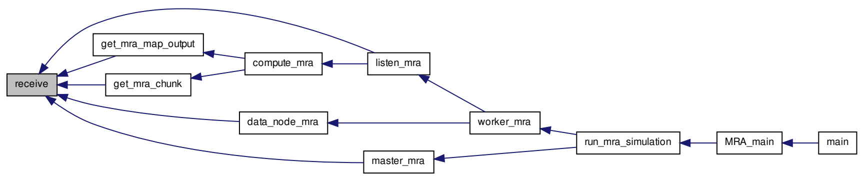
Parameters

msg	Where to store the received message.
mailbox	The mailbox alias.

Returns

The status of the transfer.

Here is the caller graph for this function:



4.6.1.5 size_t **reduce_mra_input_size** (size_t *rid*)

Return the input size of a reduce task.

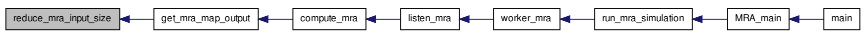
Parameters

rid	The reduce task ID.

Returns

The task input size in bytes.

Here is the caller graph for this function:



4.6.1.6 msg_error_t **send** (const char ∗ *str,* double *cpu,* double *net,* void ∗ *data,* const char ∗ *mailbox*)

Send a message/task.

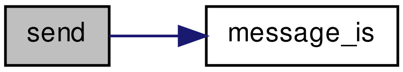
Parameters

str	The message.
cpu	The amount of cpu required by the task.
net	The message size in bytes.
data	Any data to attatch to the message.
mailbox	The destination mailbox alias.

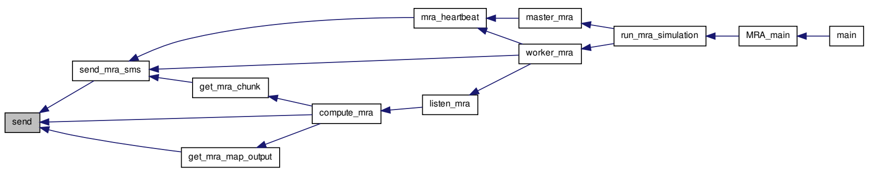
Returns

The MSG status of the operation.

Here is the call graph for this function:



Here is the caller graph for this function:



4.6.1.7 msg_error_t **send_mra_sms** (const char ∗ *str*, const char ∗ *mailbox*)

Send a short message, of size zero.

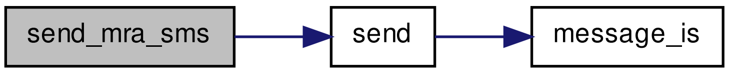
Parameters

str	The message.
mailbox	The destination mailbox alias.

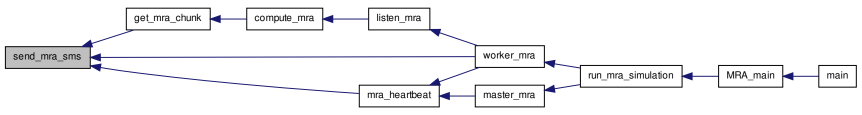
Returns

The MSG status of the operation.

Here is the call graph for this function:



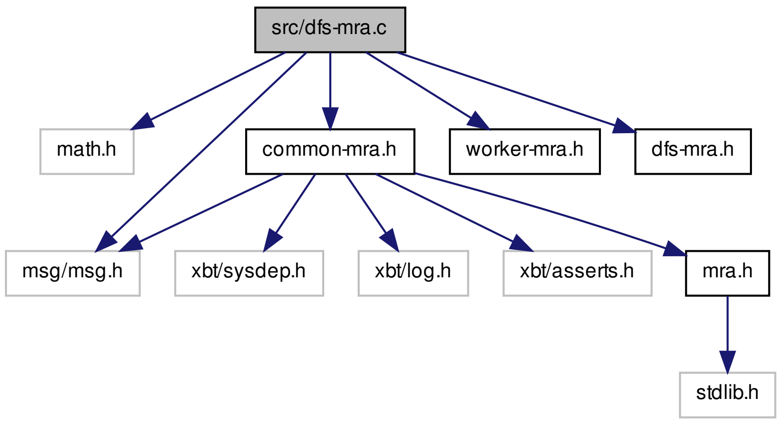
Here is the caller graph for this function:



4.6.1.8 XBT_LOG_EXTERNAL_DEFAULT_CATEGORY (msg_test)

4.7 src/dfs-mra.c File Reference

`#include <math.h>` `#include <msg/msg.h>` `#include "common-mra.h"` `#include "worker-mra.h"` `#include "dfs-mra.h"` Include dependency graph for dfs-mra.c:



Functions

- XBT_LOG_EXTERNAL_DEFAULT_CATEGORY (msg_test)
- static void send_mra_data (msg_task_t msg)

  Process that responds to data requests.
- void distribute_data_mra (void)

  Distribute chunks (and replicas) to DataNodes.
- void default_mra_dfs_f (char ∗∗mra_dfs_matrix, size_t chunks, size_t workers_-mra, int replicas)

  Default data distribution algorithm.
- size_t find_random_mra_chunk_owner (int cid)

  Choose a random DataNode that owns a specific chunk.
- int data_node_mra (int argc, char ∗argv[])

  DataNode main function.

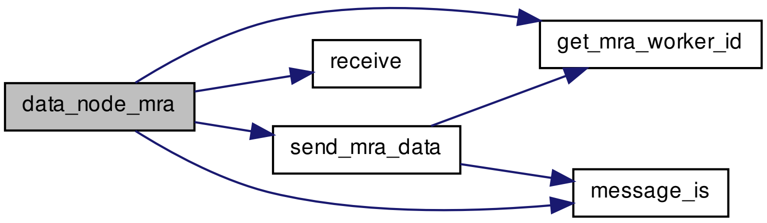
4.7.1 Function Documentation

4.7.1.1 int data_node_mra (int *argc,* char ∗ *argv[]*)

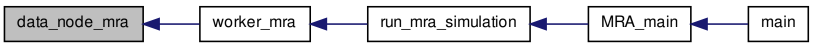
DataNode main function.

Process that listens for data requests.

Here is the call graph for this function:



Here is the caller graph for this function:



4.7.1.2 void **default_mra_dfs_f** (char ∗∗ *mra_dfs_matrix,* size_t *chunks,* size_t *workers_mra,* int *replicas*)

Default data distribution algorithm.

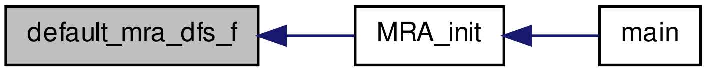
de workers --> workers_hosts[id] (array) capacidade --> MSG_get_host_speed (config_mra.workers[owner]) --> Calcula a capacidade computacional relativa de cada worker baseado na capacidade total da grid. --> É o array com as tribuições brutas, antes do ajuste de menor te_exec --> É o array com o valor de previsão de término de todas as tarefas distribuídas ao worker; --> É o array com o tempo que será utilizado para encontar a melhor distribuição --> É o array que contém o tempo de cada worker para executar uma tarefa computacional padrão

config_mra.slots_mra[MRA_MAP];

--> verifica qual é o maior tempo de execução previsto

Ajuste de Força Bruta com uma Otimização Combinatória para obter uma distribuição de chunks com o menor tempo de execução possível

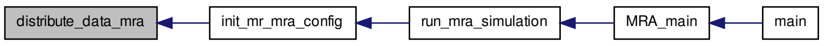
Here is the caller graph for this function:



4.7.1.3 void distribute_data_mra (void)

Distribute chunks (and replicas) to DataNodes.

Here is the caller graph for this function:



4.7.1.4 size_t find_random_mra_chunk_owner (int *cid*)

Choose a random DataNode that owns a specific chunk.

Distribution of Data Replication

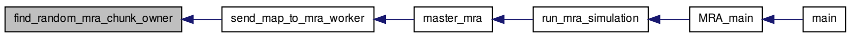
Parameters

cid	The chunk ID.

Returns

The ID of the DataNode.

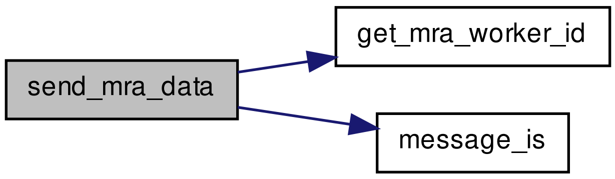
Here is the caller graph for this function:



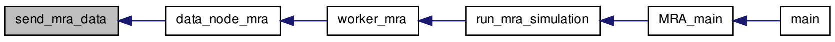
4.7.1.5 static void send_mra_data (msg_task_t *msg*) [static]

Process that responds to data requests.

Here is the call graph for this function:



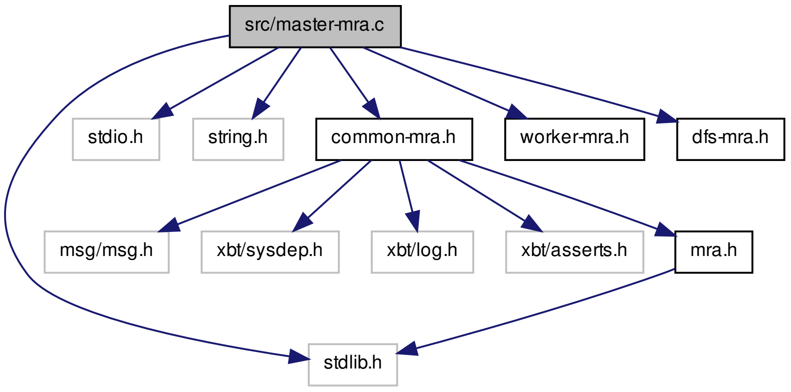
Here is the caller graph for this function:



4.7.1.6 XBT_LOG_EXTERNAL_DEFAULT_CATEGORY (msg_test)

4.8 src/master-mra.c File Reference

`#include <stdlib.h> #include <stdio.h> #include <string.h> #include "common-mra.h" #include "worker-mra.h" #include` `"dfs-mra.h"` Include dependency graph for master-mra.c:



Functions

- XBT_LOG_EXTERNAL_DEFAULT_CATEGORY (msg_test)
- static void print_mra_config (void)

  Print the job configuration.
- static void print_mra_stats (void)

  Print job statistics.
- static int is_straggler_mra (enum phase_e phase, msg_host_t worker)

  Checks if a worker is a straggler.
- static int task_time_elapsed_mra (msg_task_t task)

  Returns for how long a task is running.
- static void set_mra_speculative_tasks (enum phase_e phase, msg_host_t worker)

  Mark the tasks of a straggler as possible speculative tasks.
- static void send_map_to_mra_worker (msg_host_t dest)

  Choose a map task, and send it to a worker.
- static void send_reduce_to_mra_worker (msg_host_t dest)

  Choose a reduce task, and send it to a worker.
- static void send_mra_task (enum phase_e phase, size_t tid, size_t data_src, msg_host_t dest)

  Send a task to a worker.
- static void finish_all_mra_task_copies (mra_task_info_t ti)

  Kill all copies of a task.
- int master_mra (int argc, char ∗argv[])

  Main master function.

Variables

- static FILE ∗ tasks_log

4.8.1 Function Documentation

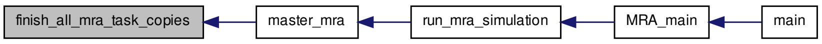
4.8.1.1 static void **finish_all_mra_task_copies** (**mra_task_info_t** *ti*) [static]

Kill all copies of a task.

Parameters

ti	The task information of any task instance.

Here is the caller graph for this function:



4.8.1.2 static int **is_straggler_mra** (enum **phase_e** *phase*, msg_host_t *worker*) [static]

Checks if a worker is a straggler.

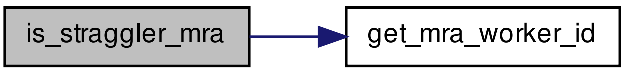
Parameters

worker	The worker to be probed.

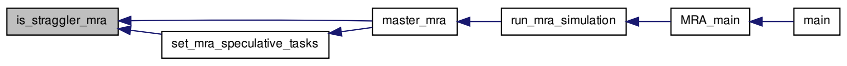
Returns

1 if true, 0 if false.

Here is the call graph for this function:



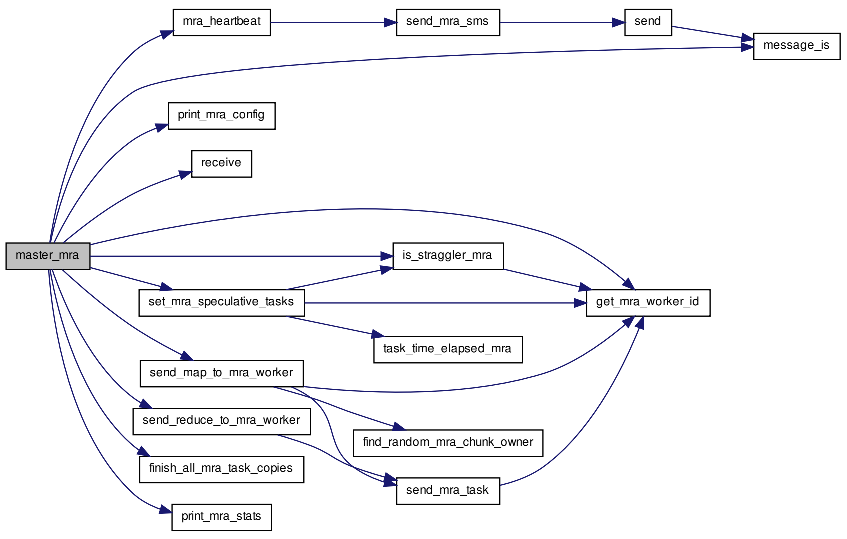
Here is the caller graph for this function:



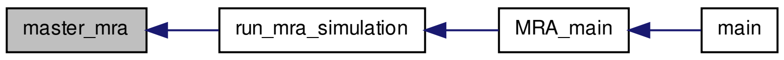
4.8.1.3 int master_mra (int *argc,* char ∗ *argv[ ]*)

Main master function.

Here is the call graph for this function:



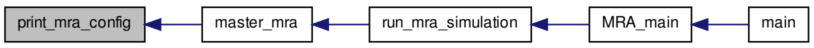
Here is the caller graph for this function:



4.8.1.4 static void **print_mra_config** (void) [static]

Print the job configuration.

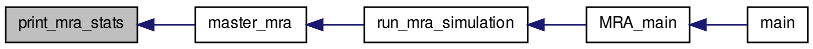
Here is the caller graph for this function:



4.8.1.5 static void **print_mra_stats** (void) [static]

Print job statistics.

Here is the caller graph for this function:



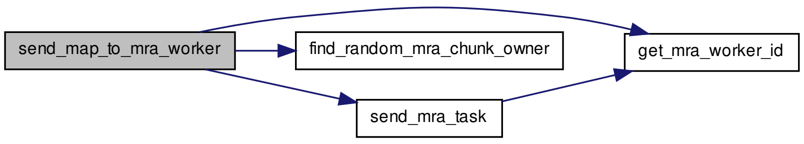
4.8.1.6 static void **send_map_to_mra_worker** (msg_host_t *dest*) [static]

Choose a map task, and send it to a worker.

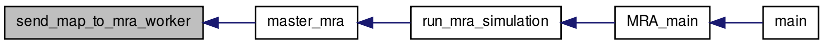
Parameters

dest	The destination worker.

Here is the call graph for this function:



Here is the caller graph for this function:



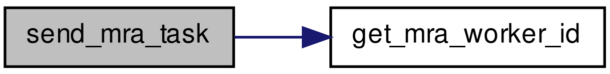
4.8.1.7 static void **send_mra_task** (enum **phase_e** *phase*, size_t *tid*, size_t *data_src*, msg_host_t *dest*) [static]

Send a task to a worker.

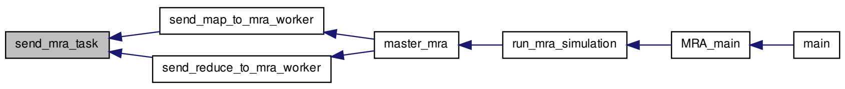
Parameters

phase	The current job phase.
tid	The task ID.
data_src	The ID of the DataNode that owns the task data.
dest	The destination worker.

Here is the call graph for this function:



Here is the caller graph for this function:



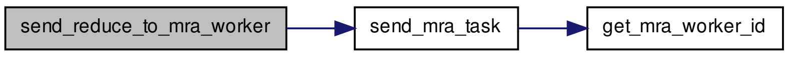
4.8.1.8 static void **send_reduce_to_mra_worker** (msg_host_t *dest*) [static]

Choose a reduce task, and send it to a worker.

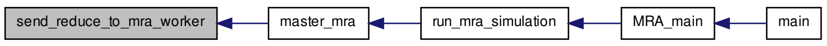
Parameters

dest	The destination worker.

Here is the call graph for this function:



Here is the caller graph for this function:



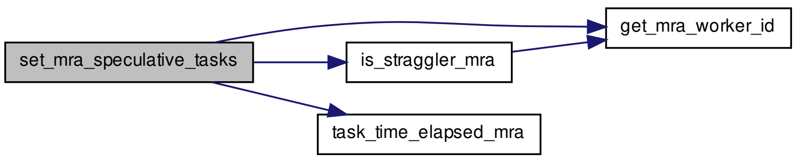
4.8.1.9 static void set_mra_speculative_tasks (enum phase_e *phase,* msg_host_t *worker*) [static]

Mark the tasks of a straggler as possible speculative tasks.

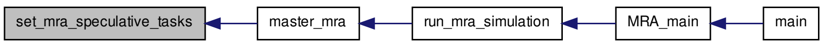
Parameters

worker	The straggler worker.

Here is the call graph for this function:



Here is the caller graph for this function:



4.8.1.10 static int **task_time_elapsed_mra** (msg_task_t *task*) `[static]`

Returns for how long a task is running.

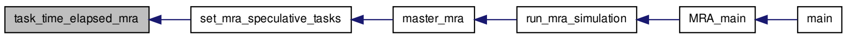
Parameters

task	The task to be probed.

Returns

The amount of seconds since the beginning of the computation.

Here is the caller graph for this function:



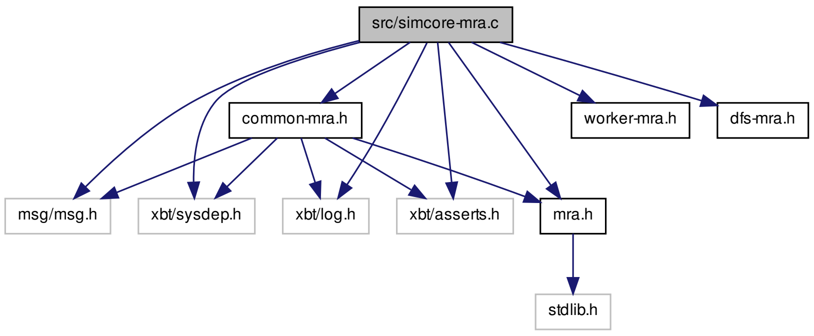
4.8.1.11 **XBT_LOG_EXTERNAL_DEFAULT_CATEGORY** (msg_test)

4.8.2 Variable Documentation

4.8.2.1 FILE∗ **tasks_log** `[static]`

4.9 src/simcore-mra.c File Reference

`#include <msg/msg.h> #include <xbt/sysdep.h> #include <xbt/log.h> #include <xbt/asserts.h> #include "common-mra.h" #include "worker-mra.h" #include "dfs-mra.h" #include` `"mra.h"` Include dependency graph for simcore-mra.c:



Defines

- #define MAX_LINE_SIZE 256

Functions

- XBT_LOG_NEW_DEFAULT_CATEGORY (msg_test,"MRA")
- int master_mra (int argc, char ∗argv[])

  Main master function.
- int worker_mra (int argc, char ∗argv[])

  Main worker function.
- static void check_config_mra (void)

  Check if the user configuration is sound.
- static msg_error_t run_mra_simulation (const char ∗platform_file, const char ∗deploy_file, const char ∗mra_config_file)
- static void init_mr_mra_config (const char ∗mra_config_file)

  Initialize the MapReduce configuration.
- static void read_mra_config_file (const char ∗file_name)

  Read the MapReduce configuration file.
- static void init_mra_config (void)

  Initialize the config structure.
- static void init_job_mra (void)

  Initialize the job structure.
- static void init_mra_stats (void)

  Initialize the stats structure.
- static void free_mra_global_mem (void)

  Free allocated memory for global variables.
- int MRA_main (const char ∗plat, const char ∗depl, const char ∗conf)

4.9.1 Define Documentation

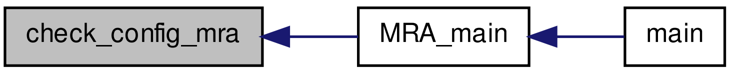
4.9.1.1 #define **MAX_LINE_SIZE** 256

4.9.2 Function Documentation

4.9.2.1 static void **check_config_mra** (void) `[static]`

Check if the user configuration is sound.

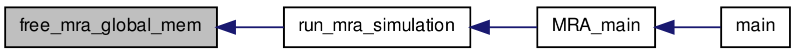
Here is the caller graph for this function:



4.9.2.2 static void **free_mra_global_mem** (void) `[static]`

Free allocated memory for global variables.

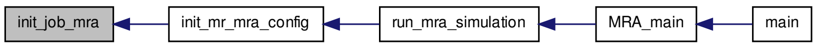
Here is the caller graph for this function:



4.9.2.3 static void **init_job_mra** (void) `[static]`

Initialize the job structure.

Here is the caller graph for this function:



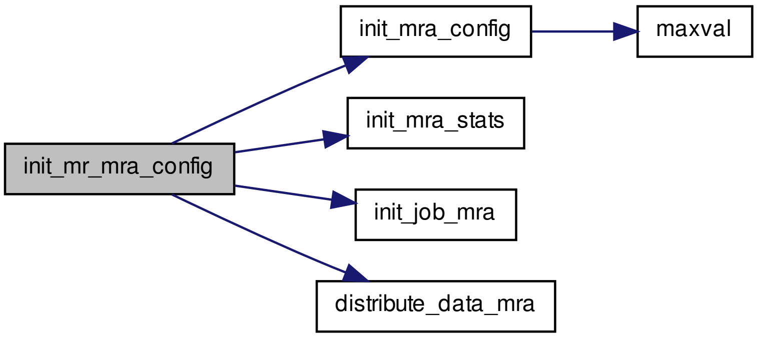
4.9.2.4 static void init_mr_mra_config (const char ∗ *mra_config_file*) [static]

Initialize the MapReduce configuration.

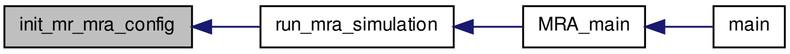
Parameters

mra_config-_file	The path/name of the configuration file.

Here is the call graph for this function:



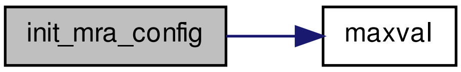
Here is the caller graph for this function:



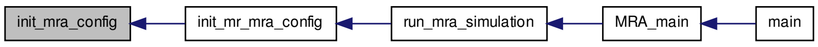
4.9.2.5 static void init_mra_config (void) [static]

Initialize the config structure.

Here is the call graph for this function:



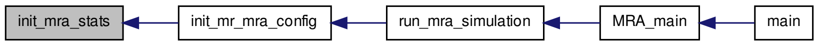
Here is the caller graph for this function:



4.9.2.6 static void init_mra_stats (void) [static]

Initialize the stats structure.

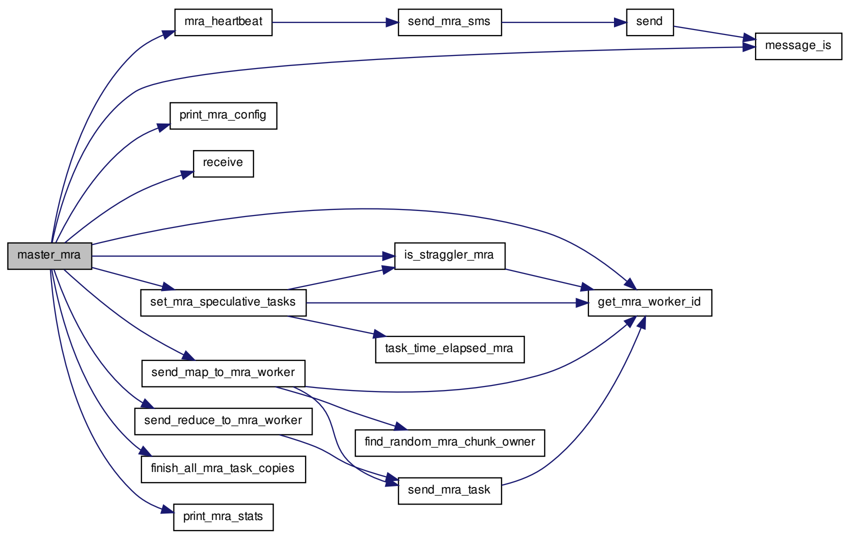
Here is the caller graph for this function:



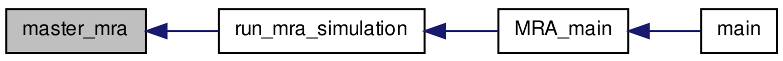
4.9.2.7 int master_mra (int *argc,* char ∗ *argv[]*)

Main master function.

Here is the call graph for this function:

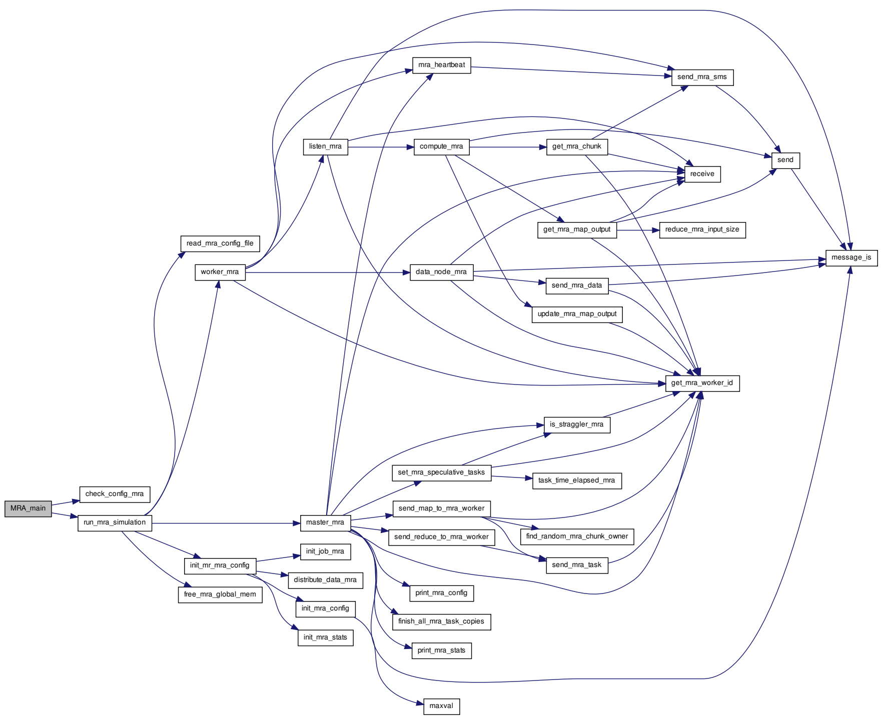


Here is the caller graph for this function:

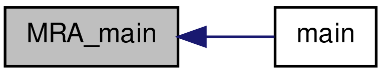


4.9.2.8 int **MRA_main** (const char ∗ *plat,* const char ∗ *depl,* const char ∗ *conf*)

Here is the call graph for this function:



Here is the caller graph for this function:



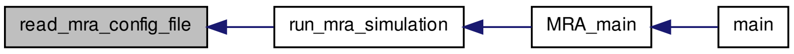
4.9.2.9 static void **read_mra_config_file** (const char ∗ *file_name*) [static]

Read the MapReduce configuration file.

Parameters

file_name	The path/name of the configuration file.

Here is the caller graph for this function:

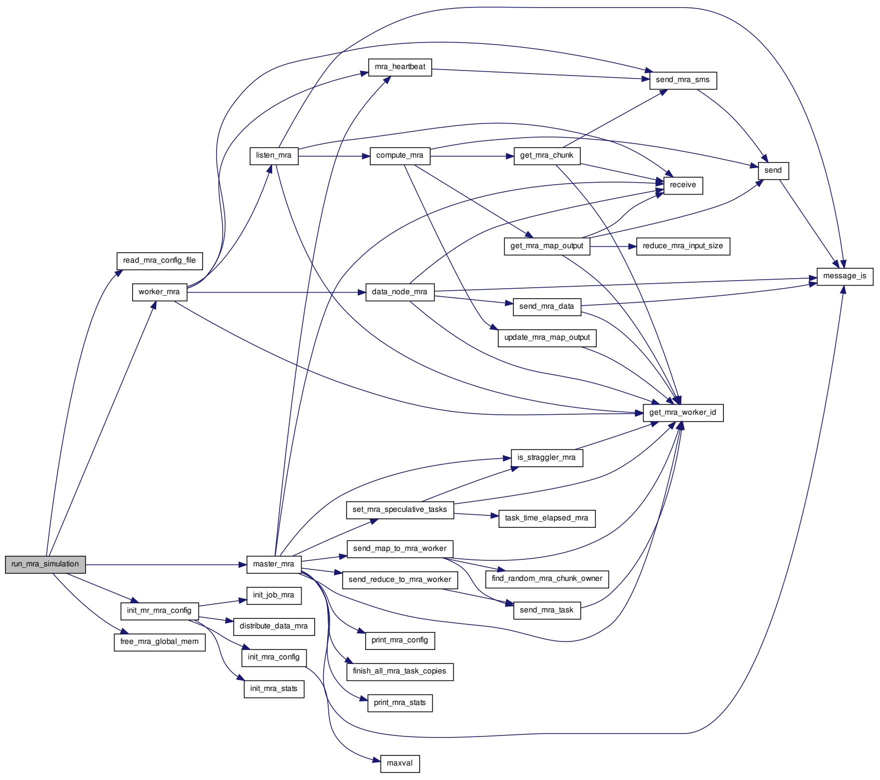


4.9.2.10 static msg_error_t **run_mra_simulation** (const char * *platform_file*, const char * *deploy_file*, const char * *mra_config_file*) `[static]`

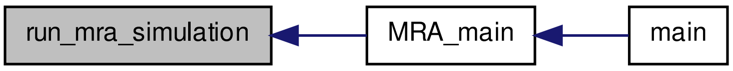
Parameters

platform_file	The path/name of the platform file.
deploy_file	The path/name of the deploy file.
mra_config-_file	The path/name of the configuration file.

Here is the call graph for this function:



Here is the caller graph for this function:

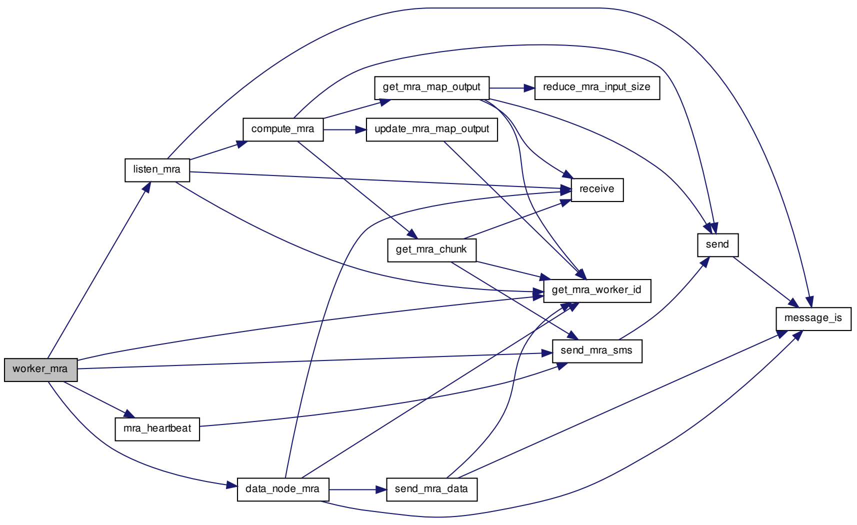


4.9.2.11 int **worker_mra** (int *argc,* char ∗ *argv[]*)

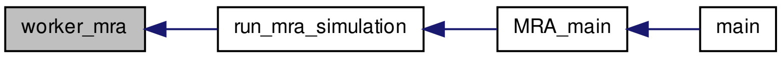
Main worker function.

This is the initial function of a worker node. It creates other processes and runs a mra-_heartbeat loop.

Here is the call graph for this function:



Here is the caller graph for this function:

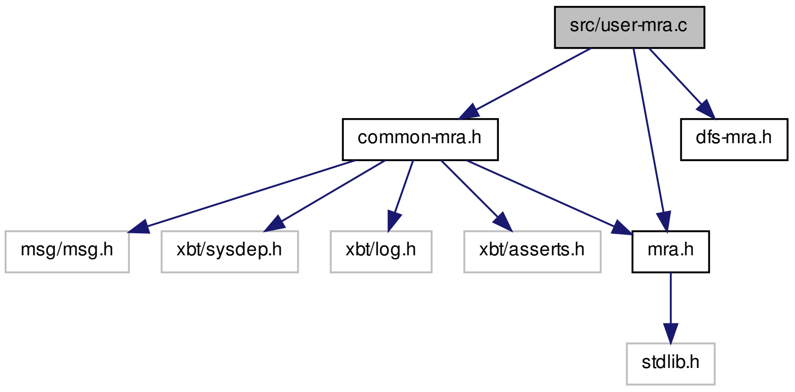


4.9.2.12 XBT_LOG_NEW_DEFAULT_CATEGORY (msg_test , "MRA")

4.10 src/user-mra.c File Reference

```
#include "common-mra.h"   #include "dfs-mra.h"   #include
```

"mra.h" Include dependency graph for user-mra.c:



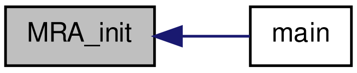
Functions

- void MRA_init (void)
- void MRA_set_task_mra_cost_f (double(∗f)(enum phase_e phase, size_t tid, size_t wid))
- void MRA_set_dfs_f (void(∗f)(char ∗∗mra_dfs_matrix, size_t chunks, size_t workers_mra, int replicas))
- void MRA_set_map_mra_output_f (int(∗f)(size_t mid, size_t rid))

4.10.1 Function Documentation

4.10.1.1 void MRA_init (void)

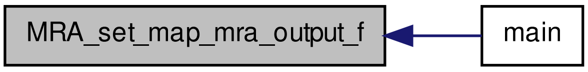
Here is the caller graph for this function:



4.10.1.2 void **MRA_set_dfs_f** (void(∗)(char ∗∗mra_dfs_matrix, size_t chunks, size_t workers_mra, int replicas) *f*)

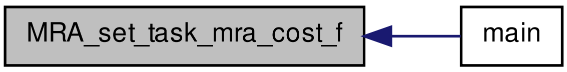
4.10.1.3 void **MRA_set_map_mra_output_f** (int(∗)(size_t mid, size_t rid) *f*)

Here is the caller graph for this function:



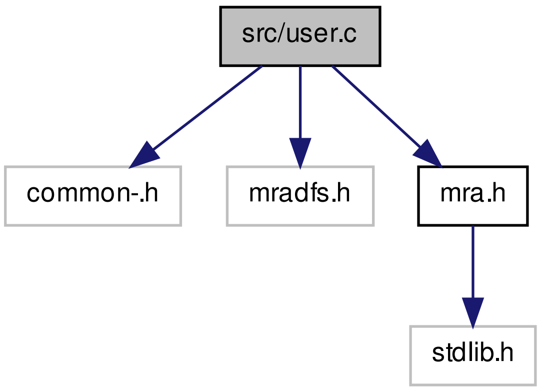
4.10.1.4 void **MRA_set_task_mra_cost_f** (double(∗)(enum **phase_e** phase, size_t tid, size_t wid) *f*)

Here is the caller graph for this function:



4.11 src/user.c File Reference

`#include "common-.h" #include "mradfs.h" #include "mra.h"` ×
Include dependency graph for user.c:



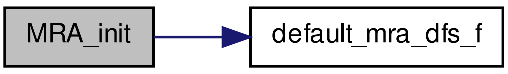
Functions

- void MRA_init (void)
- void MRA_set_task_mra_cost_f (double(∗f)(enum phase_e phase, size_t tid, size_t wid))
- void MRA_set_dfs_f (void(∗f)(char ∗∗mra_dfs_matrix, size_t chunks, size_t workers_mra, int replicas))
- void MRA_set_map_mra_output_f (int(∗f)(size_t mid, size_t rid))

4.11.1 Function Documentation

4.11.1.1 void **MRA_init** (void)

Here is the call graph for this function:



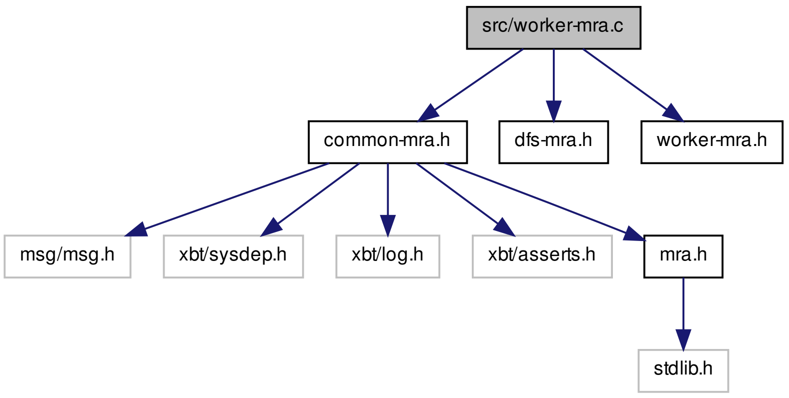
4.11.1.2 void **MRA_set_dfs_f** (void(∗)(char ∗∗mra_dfs_matrix, size_t chunks, size_t workers_mra, int replicas) *f*)

4.11.1.3 void **MRA_set_map_mra_output_f** (int(∗)(size_t mid, size_t rid) *f*)

4.11.1.4 void **MRA_set_task_mra_cost_f** (double(∗)(enum **phase_e** phase, size_t tid, size_t wid) *f*)

4.12 src/worker-mra.c File Reference

`#include "common-mra.h"` `#include "dfs-mra.h"` `#include "worker-mra.h"` Include dependency graph for worker-mra.c:



Functions

- XBT_LOG_EXTERNAL_DEFAULT_CATEGORY (msg_test)
- static void mra_heartbeat (void)

  The mra_heartbeat loop.
- static int listen_mra (int argc, char ∗argv[ ])

  Process that listens for tasks.
- static int compute_mra (int argc, char ∗argv[ ])

  Process that computes a task.
- static void update_mra_map_output (msg_host_t worker, size_t mid)

  Update the amount of data produced by a mapper.
- static void get_mra_chunk (mra_task_info_t ti)

  Get the chunk associated to a map task.
- static void get_mra_map_output (mra_task_info_t ti)

  Copy the itermediary pairs for a reduce task.
- size_t get_mra_worker_id (msg_host_t worker)

  Get the ID of a worker.
- int worker_mra (int argc, char ∗argv[ ])

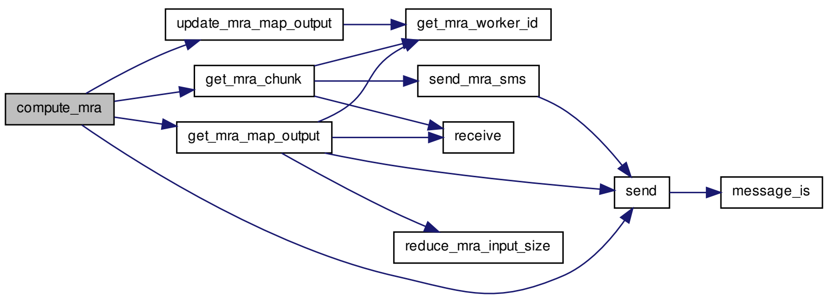
  Main worker function.

4.12.1 Function Documentation

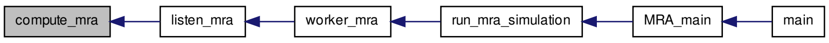
4.12.1.1 static int **compute_mra** (int *argc,* char ∗ *argv[ ]*) [static]

Process that computes a task.

Here is the call graph for this function:



Here is the caller graph for this function:



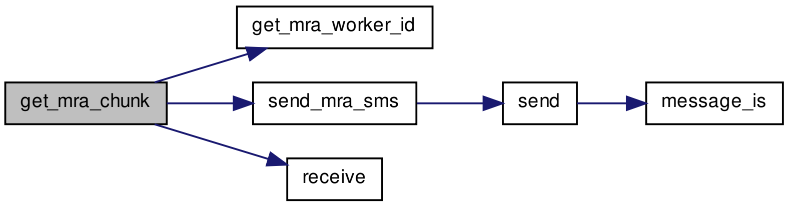
4.12.1.2 static void get_mra_chunk (mra_task_info_t *ti*) [static]

Get the chunk associated to a map task.

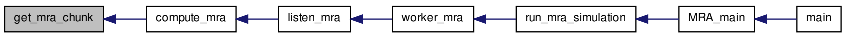
Parameters

ti	The task information.

Here is the call graph for this function:



Here is the caller graph for this function:



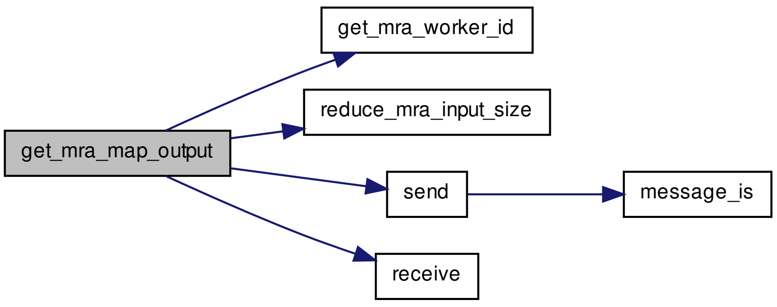
4.12.1.3 static void get_mra_map_output (mra_task_info_t *ti*) [static]

Copy the itermediary pairs for a reduce task.

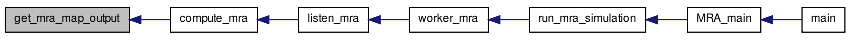
Parameters

ti	The task information.

Here is the call graph for this function:



Here is the caller graph for this function:



4.12.1.4 size_t get_mra_worker_id (msg_host_t *worker*)

Get the ID of a worker.

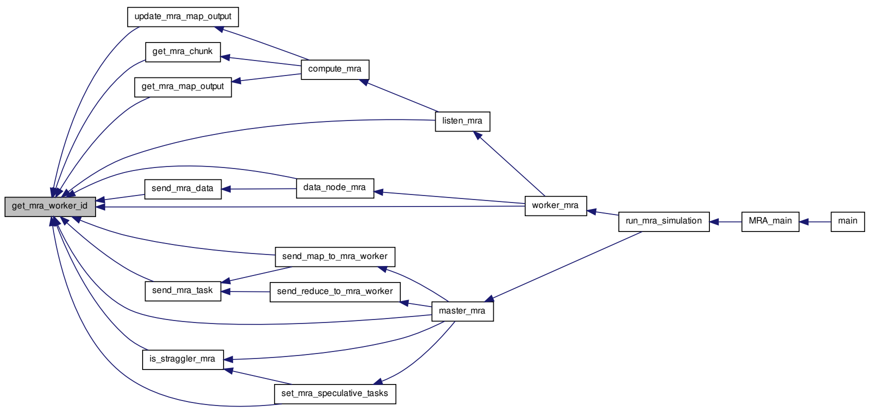
Parameters

worker	The worker node.

Returns

The worker's ID number.

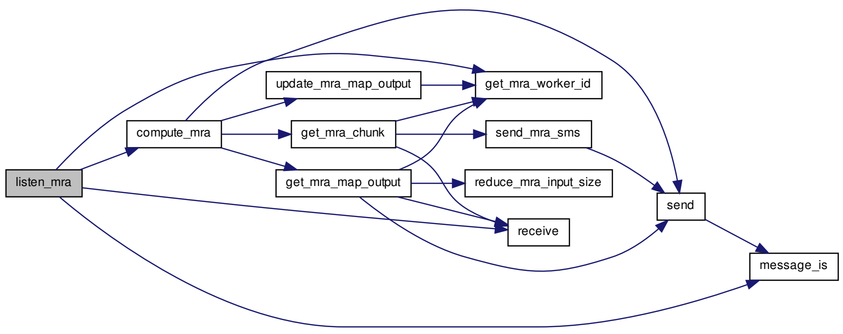
Here is the caller graph for this function:



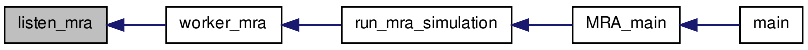
4.12.1.5 static int **listen_mra** (int *argc,* char ∗ *argv[]*) [static]

Process that listens for tasks.

Here is the call graph for this function:



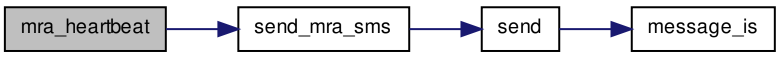
Here is the caller graph for this function:



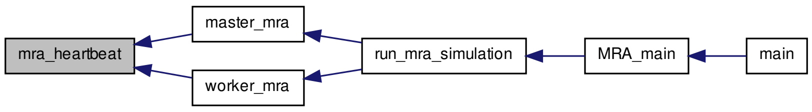
4.12.1.6 static void mra_heartbeat (void) [static]

The mra_heartbeat loop.

Here is the call graph for this function:



Here is the caller graph for this function:



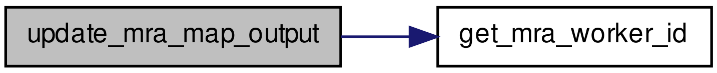
4.12.1.7 static void update_mra_map_output (msg_host_t *worker*, size_t *mid*) [static]

Update the amount of data produced by a mapper.

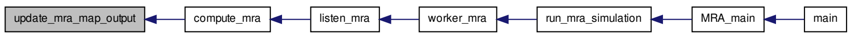
Parameters

worker	The worker that finished a map task.
mid	The ID of map task.

Here is the call graph for this function:



Here is the caller graph for this function:

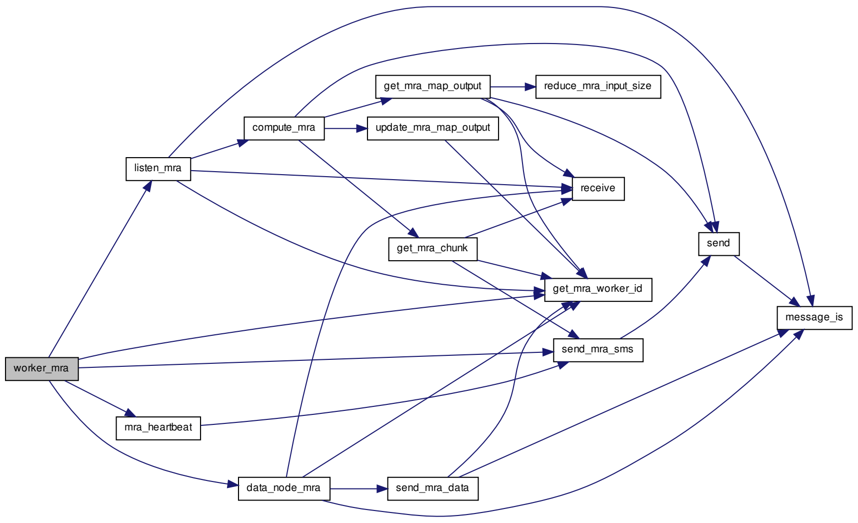


4.12.1.8 int worker_mra (int *argc,* char ∗ *argv[]*)

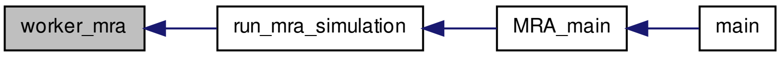
Main worker function.

This is the initial function of a worker node. It creates other processes and runs a mra-_heartbeat loop.

Here is the call graph for this function:



Here is the caller graph for this function:



4.12.1.9 XBT_LOG_EXTERNAL_DEFAULT_CATEGORY (msg_test)