

MPI Wrapper

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Chapter 1

Namespace Index

1.1 Namespace List

Here is a list of all namespaces with brief descriptions:

MPIw	7
MPIw::details	16
MPIw::errors	17
MPIw::structs	17
MPIw::types	17

Chapter 2

Class Index

2.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

MPIw::Comm_raii	19
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Chapter 3

File Index

3.1 File List

Here is a list of all files with brief descriptions:

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Chapter 4

Namespace Documentation

4.1 MPIw Namespace Reference

Namespaces

- [details](#)
- [errors](#)
- [structs](#)
- [types](#)

Classes

- class [Init_raii](#)
- class [Comm_raii](#)
- class [Group_raii](#)

Functions

- `template<typename T >`
`structs::Recv_st< T > Recv (MPI_Comm comm, int source=MPI_ANY_SOURCE, int tag=MPI_ANY_TAG, const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`void Send (MPI_Comm comm, const std::vector< T > &data, int dest, int tag, const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > Bcast (MPI_Comm comm, const std::vector< T > &data, int count, int root, const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > Bcast_managed (MPI_Comm comm, const std::vector< T > &data, int count, int root, const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`void Bcast_send (MPI_Comm comm, std::vector< T > data, const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > Bcast_recv (MPI_Comm comm, int count, int root, const std::source_location &location=std::source_location::current())`

- `template<typename T >`
`void Bcast_send_managed (MPI_Comm comm, const std::vector< T > &data, const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > Bcast_rcv_managed (MPI_Comm comm, int root, const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > Gather (MPI_Comm comm, const std::vector< T > &data, int root, const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`void Gather_send (MPI_Comm comm, const std::vector< T > &data, int root, const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > Gather_rcv (MPI_Comm comm, const std::vector< T > &data, const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > Allgather (MPI_Comm comm, const std::vector< T > &data, const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< std::vector< T > > Gatherv (MPI_Comm comm, const std::vector< T > &data, int root, const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`void Gatherv_send (MPI_Comm comm, const std::vector< T > &data, int root, const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< std::vector< T > > Gatherv_rcv (MPI_Comm comm, const std::vector< T > &data, const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< std::vector< T > > Allgatherv (MPI_Comm comm, const std::vector< T > &data, const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > Scatter (MPI_Comm comm, const std::vector< T > &data, int count, int root, const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > Scatter_send (MPI_Comm comm, const std::vector< T > &data, const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > Scatter_rcv (MPI_Comm comm, int count, int root, const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > Scatter_send_managed (MPI_Comm comm, const std::vector< T > &data, const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > Scatter_rcv_managed (MPI_Comm comm, int root, const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > Scatterv (MPI_Comm comm, const std::vector< std::vector< T > > &data, int root, const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > Scatterv_send (MPI_Comm comm, const std::vector< std::vector< T > > &data, const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > Scatterv_rcv (MPI_Comm comm, int root, const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > Reduce (MPI_Comm comm, const std::vector< T > &data, MPI_Op op, int root, const std::source_location &location=std::source_location::current())`

- `template<typename T >`
`void Reduce_send (MPI_Comm comm, const std::vector< T > &data, MPI_Op op, int root, const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > Reduce_recv (MPI_Comm comm, const std::vector< T > &data, MPI_Op op, const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > AllReduce (MPI_Comm comm, const std::vector< T > &data, MPI_Op op, const std::source_location &location=std::source_location::current())`
- `void Barrier (MPI_Comm comm, const std::source_location &location=std::source_location::current())`
- `int Get_count (const MPI_Status &status, MPI_Datatype type, const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`int Get_count (const MPI_Status &status, const std::source_location &location=std::source_location::current())`
- `int Comm_rank (MPI_Comm comm, const std::source_location &location=std::source_location::current())`
- `int Comm_size (MPI_Comm comm, const std::source_location &location=std::source_location::current())`
- `int Group_rank (MPI_Group group, const std::source_location &location=std::source_location::current())`
- `int Group_size (MPI_Group group, const std::source_location &location=std::source_location::current())`
- `std::string Get_processor_name (const std::source_location &location=std::source_location::current())`

4.1.1 Function Documentation

4.1.1.1 Allgather()

```
template<typename T >
std::vector<T> MPIw::Allgather (
    MPI_Comm comm,
    const std::vector< T > data,
    const std::source_location & location = std::source_location::current() )
```

4.1.1.2 Allgatherv()

```
template<typename T >
std::vector<std::vector<T> > MPIw::Allgatherv (
    MPI_Comm comm,
    const std::vector< T > & data,
    const std::source_location & location = std::source_location::current() )
```

4.1.1.3 AllReduce()

```
template<typename T >
std::vector<T> MPIw::AllReduce (
    MPI_Comm comm,
    const std::vector< T > & data,
    MPI_Op op,
    const std::source_location & location = std::source_location::current() )
```

4.1.1.4 Barrier()

```
void MPIw::Barrier (
    MPI_Comm comm,
    const std::source_location & location = std::source_location::current() ) [inline]
```

4.1.1.5 Bcast()

```
template<typename T >
std::vector<T> MPIw::Bcast (
    MPI_Comm comm,
    const std::vector< T > & data,
    int count,
    int root,
    const std::source_location & location = std::source_location::current() )
```

4.1.1.6 Bcast_managed()

```
template<typename T >
std::vector<T> MPIw::Bcast_managed (
    MPI_Comm comm,
    const std::vector< T > & data,
    int count,
    int root,
    const std::source_location & location = std::source_location::current() )
```

4.1.1.7 Bcast_recv()

```
template<typename T >
std::vector<T> MPIw::Bcast_recv (
    MPI_Comm comm,
    int count,
    int root,
    const std::source_location & location = std::source_location::current() )
```

4.1.1.8 Bcast_recv_managed()

```
template<typename T >
std::vector<T> MPIw::Bcast_recv_managed (
    MPI_Comm comm,
    int root,
    const std::source_location & location = std::source_location::current() )
```


4.1.1.9 Bcast_send()

```
template<typename T >
void MPIw::Bcast_send (
    MPI_Comm comm,
    std::vector< T > data,
    const std::source_location & location = std::source_location::current() )
```

4.1.1.10 Bcast_send_managed()

```
template<typename T >
void MPIw::Bcast_send_managed (
    MPI_Comm comm,
    const std::vector< T > & data,
    const std::source_location & location = std::source_location::current() )
```

4.1.1.11 Comm_rank()

```
int MPIw::Comm_rank (
    MPI_Comm comm,
    const std::source_location & location = std::source_location::current() ) [inline]
```

4.1.1.12 Comm_size()

```
int MPIw::Comm_size (
    MPI_Comm comm,
    const std::source_location & location = std::source_location::current() ) [inline]
```

4.1.1.13 Gather()

```
template<typename T >
std::vector<T> MPIw::Gather (
    MPI_Comm comm,
    const std::vector< T > & data,
    int root,
    const std::source_location & location = std::source_location::current() )
```

4.1.1.14 Gather_recv()

```
template<typename T >
std::vector<T> MPIw::Gather_recv (
    MPI_Comm comm,
    const std::vector< T > & data,
    const std::source_location & location = std::source_location::current() )
```

4.1.1.15 Gather_send()

```
template<typename T >
void MPIw::Gather_send (
    MPI_Comm comm,
    const std::vector< T > & data,
    int root,
    const std::source_location & location = std::source_location::current() )
```

4.1.1.16 Gatherv()

```
template<typename T >
std::vector<std::vector<T> > MPIw::Gatherv (
    MPI_Comm comm,
    const std::vector< T > & data,
    int root,
    const std::source_location & location = std::source_location::current() )
```

4.1.1.17 Gatherv_recv()

```
template<typename T >
std::vector<std::vector<T> > MPIw::Gatherv_recv (
    MPI_Comm comm,
    const std::vector< T > & data,
    const std::source_location & location = std::source_location::current() )
```

4.1.1.18 Gatherv_send()

```
template<typename T >
void MPIw::Gatherv_send (
    MPI_Comm comm,
    const std::vector< T > & data,
    int root,
    const std::source_location & location = std::source_location::current() )
```

4.1.1.19 Get_count() [1/2]

```
template<typename T >
int MPIw::Get_count (
    const MPI_Status & status,
    const std::source_location & location = std::source_location::current() )
```

4.1.1.20 Get_count() [2/2]

```
int MPIw::Get_count (
    const MPI_Status & status,
    MPI_Datatype type,
    const std::source_location & location = std::source_location::current() ) [inline]
```

4.1.1.21 Get_processor_name()

```
std::string MPIw::Get_processor_name (
    const std::source_location & location = std::source_location::current() ) [inline]
```

4.1.1.22 Group_rank()

```
int MPIw::Group_rank (
    MPI_Group group,
    const std::source_location & location = std::source_location::current() ) [inline]
```

4.1.1.23 Group_size()

```
int MPIw::Group_size (
    MPI_Group group,
    const std::source_location & location = std::source_location::current() ) [inline]
```

4.1.1.24 Recv()

```
template<typename T >
structs::Recv_st<T> MPIw::Recv (
    MPI_Comm comm,
    int source = MPI_ANY_SOURCE,
    int tag = MPI_ANY_TAG,
    const std::source_location & location = std::source_location::current() )
```

4.1.1.25 Reduce()

```
template<typename T >
std::vector<T> MPIw::Reduce (
    MPI_Comm comm,
    const std::vector< T > & data,
    MPI_Op op,
    int root,
    const std::source_location & location = std::source_location::current() )
```

4.1.1.26 Reduce_recv()

```
template<typename T >
std::vector<T> MPIw::Reduce_recv (
    MPI_Comm comm,
    const std::vector< T > & data,
    MPI_Op op,
    const std::source_location & location = std::source_location::current() )
```

4.1.1.27 Reduce_send()

```
template<typename T >
void MPIw::Reduce_send (
    MPI_Comm comm,
    const std::vector< T > & data,
    MPI_Op op,
    int root,
    const std::source_location & location = std::source_location::current() )
```

4.1.1.28 Scatter()

```
template<typename T >
std::vector<T> MPIw::Scatter (
    MPI_Comm comm,
    const std::vector< T > & data,
    int count,
    int root,
    const std::source_location & location = std::source_location::current() )
```

4.1.1.29 Scatter_recv()

```
template<typename T >
std::vector<T> MPIw::Scatter_recv (
    MPI_Comm comm,
    int count,
    int root,
    const std::source_location & location = std::source_location::current() )
```

4.1.1.30 Scatter_recv_managed()

```
template<typename T >
std::vector<T> MPIw::Scatter_recv_managed (
    MPI_Comm comm,
    int root,
    const std::source_location & location = std::source_location::current() )
```

4.1.1.31 Scatter_send()

```
template<typename T >
std::vector<T> MPIw::Scatter_send (
    MPI_Comm comm,
    const std::vector< T > & data,
    const std::source_location & location = std::source_location::current() )
```

4.1.1.32 Scatter_send_managed()

```
template<typename T >
std::vector<T> MPIw::Scatter_send_managed (
    MPI_Comm comm,
    const std::vector< T > & data,
    const std::source_location & location = std::source_location::current() )
```

4.1.1.33 Scatterv()

```
template<typename T >
std::vector<T> MPIw::Scatterv (
    MPI_Comm comm,
    const std::vector< std::vector< T >> & data,
    int root,
    const std::source_location & location = std::source_location::current() )
```

4.1.1.34 Scatterv_recv()

```
template<typename T >
std::vector<T> MPIw::Scatterv_recv (
    MPI_Comm comm,
    int root,
    const std::source_location & location = std::source_location::current() )
```

4.1.1.35 Scatterv_send()

```
template<typename T >
std::vector<T> MPIw::Scatterv_send (
    MPI_Comm comm,
    const std::vector< std::vector< T >> & data,
    const std::source_location & location = std::source_location::current() )
```

4.1.1.36 Send()

```
template<typename T >
void MPIw::Send (
    MPI_Comm comm,
    const std::vector< T > & data,
    int dest,
    int tag,
    const std::source_location & location = std::source_location::current() )
```

4.2 MPIw::details Namespace Reference

Functions

- template<typename T >
std::vector< std::vector< T >> [split_buffer](#) (const std::vector< T > &buffer, const std::vector< T > &offsets)

4.2.1 Function Documentation

4.2.1.1 split_buffer()

```
template<typename T >
std::vector<std::vector<T> > MPIw::details::split_buffer (
    const std::vector< T > & buffer,
    const std::vector< T > & offsets )
```

4.3 MPIw::errors Namespace Reference

Functions

- `std::string error_message` (int error_code)
- `void check_code` (int error_code, const std::source_location &location=std::source_location::current())

4.3.1 Function Documentation

4.3.1.1 check_code()

```
void MPIw::errors::check_code (
    int error_code,
    const std::source_location & location = std::source_location::current() ) [inline]
```

4.3.1.2 error_message()

```
std::string MPIw::errors::error_message (
    int error_code ) [inline]
```

4.4 MPIw::structs Namespace Reference

Classes

- struct `Recv_st`

4.5 MPIw::types Namespace Reference

Functions

- `template<typename T >`
`MPI_Datatype get_mpi_type` (T=T{})

4.5.1 Function Documentation

4.5.1.1 get_mpi_type()

```
template<typename T >
MPI_Datatype MPIw::types::get_mpi_type (
    T = T{} )
```


Chapter 5

Class Documentation

5.1 MPIw::Comm_raii Class Reference

```
#include <raii.hpp>
```

Public Member Functions

- [Comm_raii](#) ()=default
- [Comm_raii](#) (const [Comm_raii](#) &)=delete
- [Comm_raii](#) & [operator=](#) (const [Comm_raii](#) &)=delete
- [Comm_raii](#) ([Comm_raii](#) &&)=delete
- [Comm_raii](#) && [operator=](#) ([Comm_raii](#) &&)=delete
- [~Comm_raii](#) ()
- MPI_Comm & [get](#) ()
- [operator MPI_Comm](#) ()
- MPI_Comm * [operator&](#) ()

Public Attributes

- MPI_Comm [comm](#) = MPI_COMM_NULL

5.1.1 Constructor & Destructor Documentation

5.1.1.1 Comm_raii() [1/3]

```
MPIw::Comm_raii::Comm_raii ( ) [default]
```

5.1.1.2 Comm_raii() [2/3]

```
MPIw::Comm_raii::Comm_raii (
    const Comm_raii & ) [delete]
```

5.1.1.3 Comm_raii() [3/3]

```
MPIw::Comm_raii::Comm_raii (
    Comm_raii && ) [delete]
```

5.1.1.4 ~Comm_raii()

```
MPIw::Comm_raii::~~Comm_raii ( ) [inline]
```

5.1.2 Member Function Documentation

5.1.2.1 get()

```
MPI_Comm& MPIw::Comm_raii::get ( ) [inline]
```

5.1.2.2 operator MPI_Comm()

```
MPIw::Comm_raii::operator MPI_Comm ( ) [inline]
```

5.1.2.3 operator&()

```
MPI_Comm* MPIw::Comm_raii::operator& ( ) [inline]
```

5.1.2.4 operator=() [1/2]

```
Comm_raii& MPIw::Comm_raii::operator= (
    Comm_raii && ) [delete]
```

5.1.2.5 operator=() [2/2]

```
Comm_raii& MPIw::Comm_raii::operator= (
    const Comm_raii & ) [delete]
```

5.1.3 Member Data Documentation

5.1.3.1 comm

```
MPI_Comm MPIw::Comm_raii::comm = MPI_COMM_NULL
```

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

- /home/somik/WSL_Workspace/cpp/mpi_wrapper/src/raii.hpp

5.2 MPIw::Group_raii Class Reference

```
#include <raii.hpp>
```

Public Member Functions

- [Group_raii\(\)](#)=default
- [Group_raii\(const Group_raii &\)=delete](#)
- [Group_raii & operator= \(const Group_raii &\)=delete](#)
- [Group_raii\(Group_raii &&\)=delete](#)
- [Group_raii && operator= \(Group_raii &&\)=delete](#)
- [~Group_raii\(\)](#)
- [MPI_Group & get\(\)](#)
- [operator MPI_Group\(\)](#)
- [MPI_Group * operator&\(\)](#)

Public Attributes

- [MPI_Group group](#) = MPI_GROUP_NULL

5.2.1 Constructor & Destructor Documentation

5.2.1.1 Group_raii() [1/3]

```
MPIw::Group_raii::Group_raii ( ) [default]
```

5.2.1.2 Group_raii() [2/3]

```
MPIw::Group_raii::Group_raii (
    const Group_raii & ) [delete]
```

5.2.1.3 Group_raii() [3/3]

```
MPIw::Group_raii::Group_raii (
    Group_raii && ) [delete]
```

5.2.1.4 ~Group_raii()

```
MPIw::Group_raii::~~Group_raii ( ) [inline]
```

5.2.2 Member Function Documentation

5.2.2.1 get()

```
MPI_Group& MPIw::Group_raii::get ( ) [inline]
```

5.2.2.2 operator MPI_Group()

```
MPIw::Group_raii::operator MPI_Group ( ) [inline]
```

5.2.2.3 operator&()

```
MPI_Group* MPIw::Group_raii::operator& ( ) [inline]
```

5.2.2.4 operator=() [1/2]

```
Group_raii& MPIw::Group_raii::operator= (
    const Group_raii & ) [delete]
```

5.2.2.5 operator=() [2/2]

```
Group_raii&& MPIw::Group_raii::operator= (
    Group_raii && ) [delete]
```

5.2.3 Member Data Documentation

5.2.3.1 group

```
MPI_Group MPIw::Group_raii::group = MPI_GROUP_NULL
```

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

- /home/somik/WSL_Workspace/cpp/mpi_wrapper/src/raii.hpp

5.3 MPIw::Init_raii Class Reference

```
#include <raii.hpp>
```

Public Member Functions

- [Init_raii](#) (int *argc, char ***argv)
- [Init_raii](#) (const [Init_raii](#) &)=delete
- [Init_raii](#) & [operator=](#) (const [Init_raii](#) &)=delete
- [Init_raii](#) ([Init_raii](#) &&)=delete
- [Init_raii](#) && [operator=](#) ([Init_raii](#) &&)=delete
- [~Init_raii](#) ()

5.3.1 Constructor & Destructor Documentation

5.3.1.1 Init_raii() [1/3]

```
MPIw::Init_raii::Init_raii (
    int * argc,
    char *** argv ) [inline]
```

5.3.1.2 Init_raii() [2/3]

```
MPIw::Init_raii::Init_raii (
    const Init_raii & ) [delete]
```

5.3.1.3 Init_raii() [3/3]

```
MPIw::Init_raii::Init_raii (
    Init_raii && ) [delete]
```

5.3.1.4 ~Init_raii()

```
MPIw::Init_raii::~~Init_raii ( ) [inline]
```

5.3.2 Member Function Documentation

5.3.2.1 operator=() [1/2]

```
Init_raii& MPIw::Init_raii::operator= (
    const Init_raii & ) [delete]
```

5.3.2.2 operator=() [2/2]

```
Init_raii&& MPIw::Init_raii::operator= (
    Init_raii && ) [delete]
```

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

- /home/somik/WSL_Workspace/cpp/mpi_wrapper/src/raii.hpp

5.4 MPIw::structs::Recv_st< T > Struct Template Reference

```
#include <structs.hpp>
```

Public Attributes

- std::vector< T > [data](#)
- MPI_Status [status](#)

5.4.1 Member Data Documentation

5.4.1.1 data

```
template<typename T >  
std::vector<T> MPIw::structs::Recv_st< T >::data
```

5.4.1.2 status

```
template<typename T >  
MPI_Status MPIw::structs::Recv_st< T >::status
```

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

- [/home/somik/WSL_Workspace/cpp/mpi_wrapper/src/structs.hpp](#)

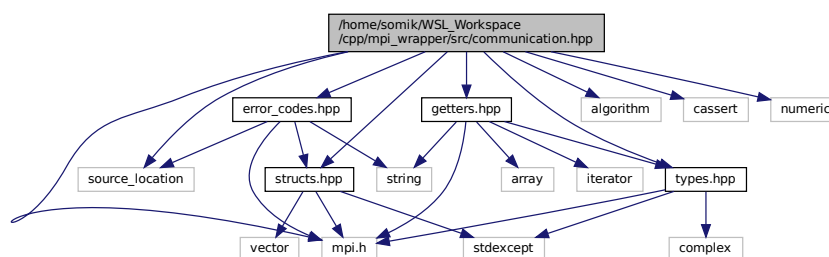
Chapter 6

File Documentation

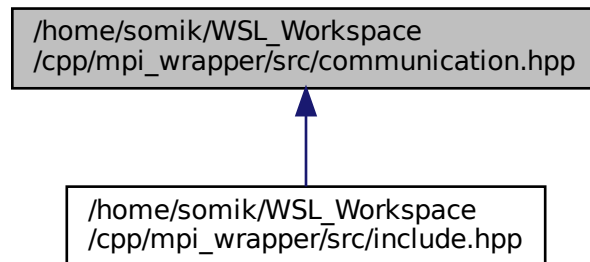
6.1 /home/somik/WSL_Workspace/cpp/mpi_wrapper/src/communication.hpp File Reference

```
#include "error_codes.hpp"
#include "getters.hpp"
#include "structs.hpp"
#include "types.hpp"
#include <algorithm>
#include <cassert>
#include <mpi.h>
#include <numeric>
#include <source_location>
```

Include dependency graph for communication.hpp:



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



Namespaces

- [MPIw](#)
- [MPIw::details](#)

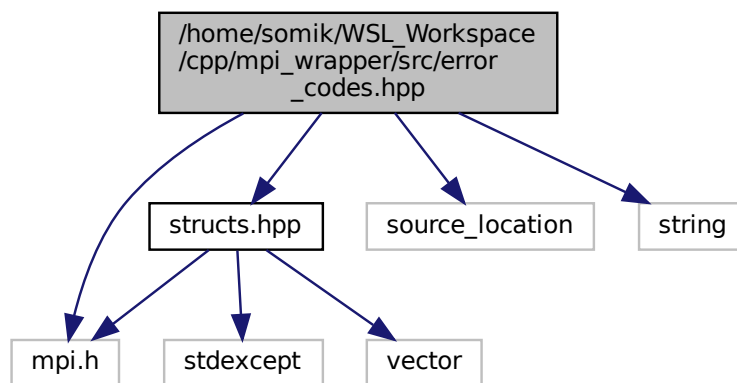
Functions

- `template<typename T >`
`std::vector< std::vector< T > > MPIw::details::split_buffer (const std::vector< T > &buffer, const std::vector< T > &offsets)`
- `template<typename T >`
`structs::Recv_st< T > MPIw::Recv (MPI_Comm comm, int source=MPI_ANY_SOURCE, int tag=MPI_ANY_TAG, const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`void MPIw::Send (MPI_Comm comm, const std::vector< T > &data, int dest, int tag, const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > MPIw::Bcast (MPI_Comm comm, const std::vector< T > &data, int count, int root, const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > MPIw::Bcast_managed (MPI_Comm comm, const std::vector< T > &data, int count, int root, const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`void MPIw::Bcast_send (MPI_Comm comm, std::vector< T > data, const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > MPIw::Bcast_recv (MPI_Comm comm, int count, int root, const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`void MPIw::Bcast_send_managed (MPI_Comm comm, const std::vector< T > &data, const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > MPIw::Bcast_recv_managed (MPI_Comm comm, int root, const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > MPIw::Gather (MPI_Comm comm, const std::vector< T > &data, int root, const std::source_location &location=std::source_location::current())`

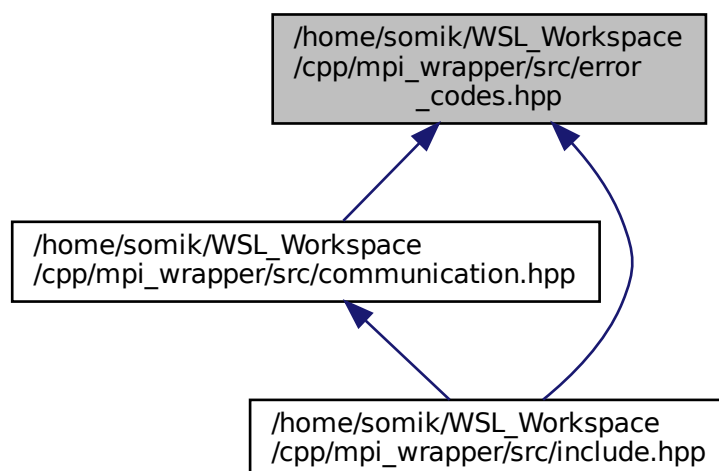
- `template<typename T >`
`void MPIw::Gather_send (MPI_Comm comm, const std::vector< T > &data, int root, const std::source_↵
location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > MPIw::Gather_rcv (MPI_Comm comm, const std::vector< T > &data, const std::source_↵
location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > MPIw::Allgather (MPI_Comm comm, const std::vector< T > data, const std::source_↵
location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< std::vector< T > > MPIw::Gatherv (MPI_Comm comm, const std::vector< T > &data, int root,
const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`void MPIw::Gatherv_send (MPI_Comm comm, const std::vector< T > &data, int root, const std::source_↵
location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< std::vector< T > > MPIw::Gatherv_rcv (MPI_Comm comm, const std::vector< T > &data,
const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< std::vector< T > > MPIw::Allgatherv (MPI_Comm comm, const std::vector< T > &data, const
std::source_location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > MPIw::Scatter (MPI_Comm comm, const std::vector< T > &data, int count, int root, const
std::source_location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > MPIw::Scatter_send (MPI_Comm comm, const std::vector< T > &data, const std::source_↵
location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > MPIw::Scatter_rcv (MPI_Comm comm, int count, int root, const std::source_location
&location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > MPIw::Scatter_send_managed (MPI_Comm comm, const std::vector< T > &data, const
std::source_location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > MPIw::Scatter_rcv_managed (MPI_Comm comm, int root, const std::source_location
&location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > MPIw::Scatterv (MPI_Comm comm, const std::vector< std::vector< T > > &data, int root,
const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > MPIw::Scatterv_send (MPI_Comm comm, const std::vector< std::vector< T > > &data,
const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > MPIw::Scatterv_rcv (MPI_Comm comm, int root, const std::source_location
&location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > MPIw::Reduce (MPI_Comm comm, const std::vector< T > &data, MPI_Op op, int root,
const std::source_location &location=std::source_location::current())`
- `template<typename T >`
`void MPIw::Reduce_send (MPI_Comm comm, const std::vector< T > &data, MPI_Op op, int root, const
std::source_location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > MPIw::Reduce_rcv (MPI_Comm comm, const std::vector< T > &data, MPI_Op op, const
std::source_location &location=std::source_location::current())`
- `template<typename T >`
`std::vector< T > MPIw::AllReduce (MPI_Comm comm, const std::vector< T > &data, MPI_Op op, const
std::source_location &location=std::source_location::current())`
- `void MPIw::Barrier (MPI_Comm comm, const std::source_location &location=std::source_location::current())`

6.2 /home/somik/WSL_Workspace/cpp/mpi_wrapper/src/error_codes.hpp File Reference

```
#include "structs.hpp"
#include <mpi.h>
#include <source_location>
#include <string>
Include dependency graph for error_codes.hpp:
```



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



Namespaces

- [MPIw](#)
- [MPIw::errors](#)

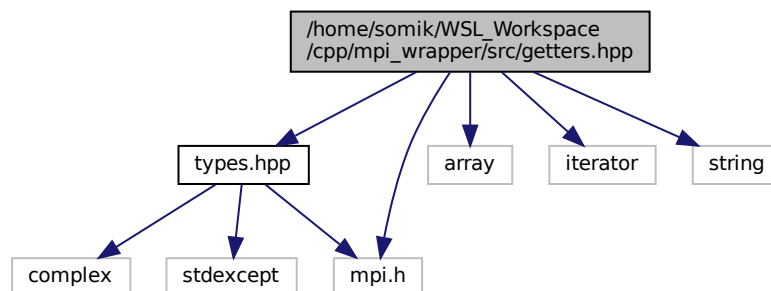
Functions

- `std::string MPIw::errors::error_message (int error_code)`
- `void MPIw::errors::check_code (int error_code, const std::source_location &location=std::source_location::current())`

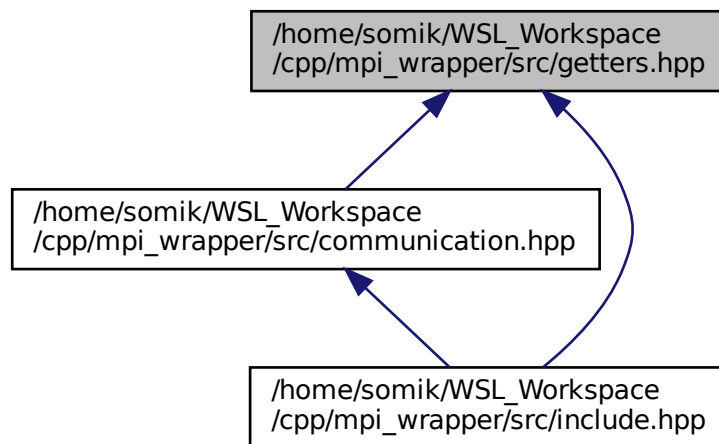
6.3 /home/somik/WSL_Workspace/cpp/mpi_wrapper/src/getters.hpp File Reference

```
#include "types.hpp"
#include <array>
#include <iterator>
#include <mpi.h>
#include <string>
```

Include dependency graph for getters.hpp:



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



Namespaces

- [MPIw](#)

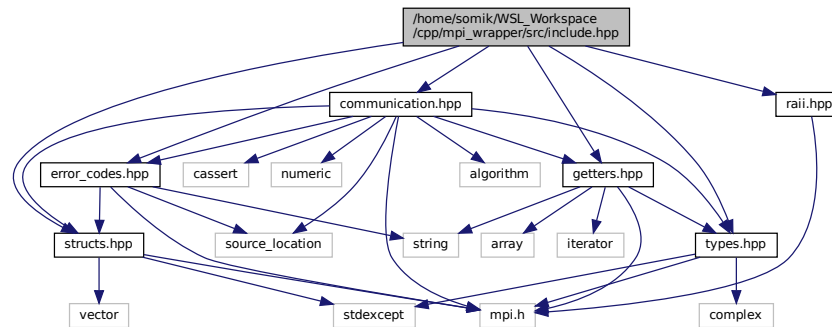
Functions

- `int MPIw::Get_count (const MPI_Status &status, MPI_Datatype type, const std::source_location &location=std::source_location::current())`
- `template<typename T >
int MPIw::Get_count (const MPI_Status &status, const std::source_location &location=std::source_location::current())`
- `int MPIw::Comm_rank (MPI_Comm comm, const std::source_location &location=std::source_location::current())`
- `int MPIw::Comm_size (MPI_Comm comm, const std::source_location &location=std::source_location::current())`
- `int MPIw::Group_rank (MPI_Group group, const std::source_location &location=std::source_location::current())`
- `int MPIw::Group_size (MPI_Group group, const std::source_location &location=std::source_location::current())`
- `std::string MPIw::Get_processor_name (const std::source_location &location=std::source_location::current())`

6.4 /home/somik/WSL_Workspace/cpp/mpi_wrapper/src/include.hpp File Reference

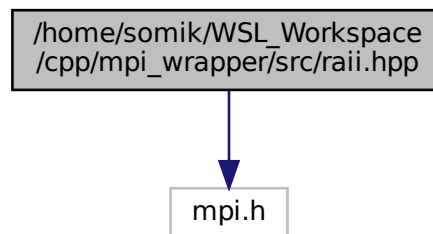
```
#include "communication.hpp"
#include "getters.hpp"
#include "raii.hpp"
#include "structs.hpp"
```

```
#include "types.hpp"
#include "error_codes.hpp"
Include dependency graph for include.hpp:
```

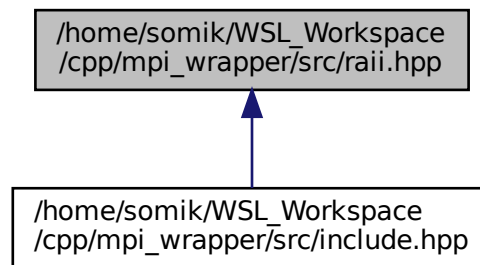


6.5 /home/somik/WSL_Workspace/cpp/mpi_wrapper/src/raii.hpp File Reference

```
#include <mpi.h>
Include dependency graph for raii.hpp:
```



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



Classes

- class [MPIw::Init_raii](#)
- class [MPIw::Comm_raii](#)
- class [MPIw::Group_raii](#)

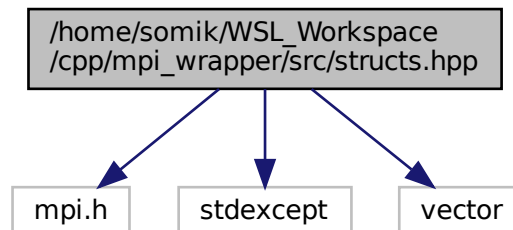
Namespaces

- [MPIw](#)

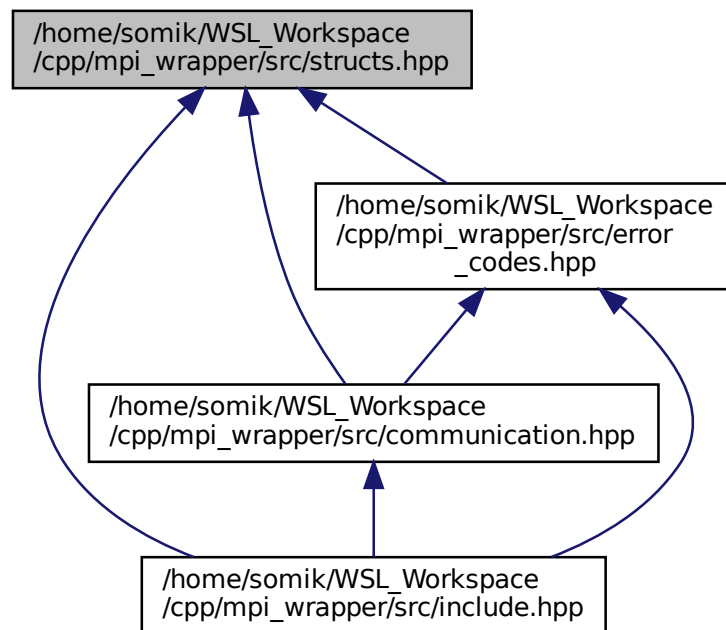
6.6 /home/somik/WSL_Workspace/cpp/mpi_wrapper/src/structs.hpp File Reference

```
#include <mpi.h>
#include <stdexcept>
#include <vector>
```

Include dependency graph for structs.hpp:



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



Classes

- struct `MPIw::structs::Recv_st< T >`

Namespaces

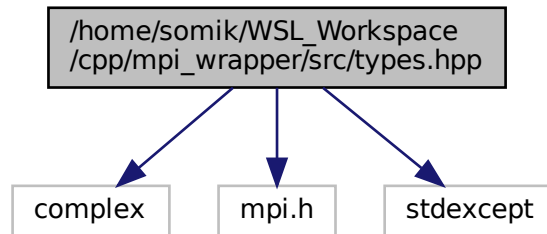
- `MPIw`
- `MPIw::structs`

6.7 /home/somik/WSL_Workspace/cpp/mpi_wrapper/src/types.hpp File Reference

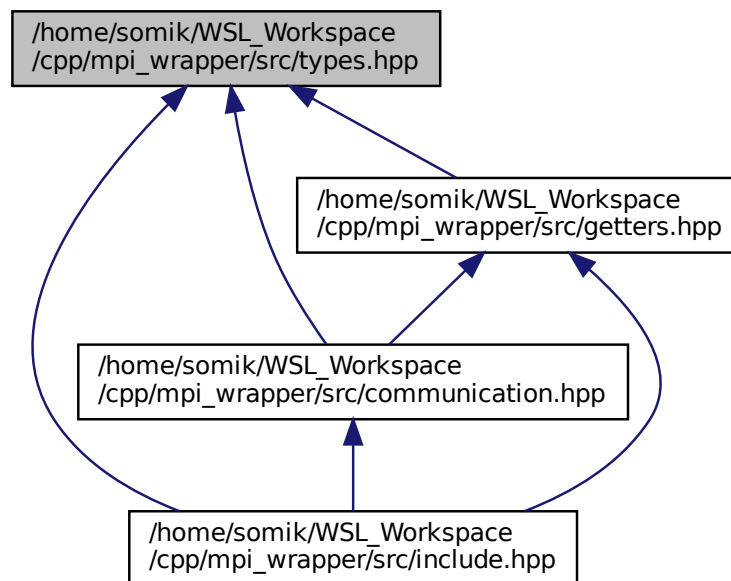
```
#include <complex>
#include <mpi.h>
```

```
#include <stdexcept>
```

Include dependency graph for types.hpp:



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



Namespaces

- `MPIw`
- `MPIw::types`

Macros

- `#define MPIw_register_type(cpp_type, mpi_type)`

Functions

- `template<typename T>`
`MPI_Datatype MPIw::types::get_mpi_type (T=T{})`
- `MPIw_register_type` (char, MPI_CHAR)
- `MPIw_register_type` (wchar_t, MPI_WCHAR)
- `MPIw_register_type` (short, MPI_SHORT)
- `MPIw_register_type` (int, MPI_INT)
- `MPIw_register_type` (long, MPI_LONG)
- `MPIw_register_type` (signed char, MPI_SIGNED_CHAR)
- `MPIw_register_type` (unsigned char, MPI_UNSIGNED_CHAR)
- `MPIw_register_type` (unsigned short, MPI_UNSIGNED_SHORT)
- `MPIw_register_type` (unsigned, MPI_UNSIGNED)
- `MPIw_register_type` (unsigned long, MPI_UNSIGNED_LONG)
- `MPIw_register_type` (float, MPI_FLOAT)
- `MPIw_register_type` (double, MPI_DOUBLE)
- `MPIw_register_type` (long double, MPI_LONG_DOUBLE)
- `MPIw_register_type` (bool, MPI_CXX_BOOL)
- `MPIw_register_type` (std::complex< float >, MPI_CXX_COMPLEX)
- `MPIw_register_type` (std::complex< double >, MPI_CXX_DOUBLE_COMPLEX)
- `MPIw_register_type` (std::complex< long double >, MPI_CXX_LONG_DOUBLE_COMPLEX)

6.7.1 Macro Definition Documentation

6.7.1.1 MPIw_register_type

```
#define MPIw_register_type(  
    cpp_type,  
    mpi_type )
```

Value:

```
namespace MPIw::types {  
    template <>  
    MPI_Datatype get_mpi_type<cpp_type>(cpp_type) {  
        return mpi_type;  
    }  
}
```

```
//  
//  
//  
//
```

6.7.2 Function Documentation

6.7.2.1 MPIw_register_type() [1/17]

```
MPIw_register_type (  
    bool ,  
    MPI_CXX_BOOL )
```

6.7.2.2 MPIw_register_type() [2/17]

```
MPIw_register_type (
    char ,
    MPI_CHAR )
```

6.7.2.3 MPIw_register_type() [3/17]

```
MPIw_register_type (
    double ,
    MPI_DOUBLE )
```

6.7.2.4 MPIw_register_type() [4/17]

```
MPIw_register_type (
    float ,
    MPI_FLOAT )
```

6.7.2.5 MPIw_register_type() [5/17]

```
MPIw_register_type (
    int ,
    MPI_INT )
```

6.7.2.6 MPIw_register_type() [6/17]

```
MPIw_register_type (
    long double ,
    MPI_LONG_DOUBLE )
```

6.7.2.7 MPIw_register_type() [7/17]

```
MPIw_register_type (
    long ,
    MPI_LONG )
```

6.7.2.8 MPIw_register_type() [8/17]

```
MPIw_register_type (
    short ,
    MPI_SHORT )
```

6.7.2.9 MPIw_register_type() [9/17]

```
MPIw_register_type (
    signed char ,
    MPI_SIGNED_CHAR )
```

6.7.2.10 MPIw_register_type() [10/17]

```
MPIw_register_type (
    std::complex< double > ,
    MPI_CXX_DOUBLE_COMPLEX )
```

6.7.2.11 MPIw_register_type() [11/17]

```
MPIw_register_type (
    std::complex< float > ,
    MPI_CXX_COMPLEX )
```

6.7.2.12 MPIw_register_type() [12/17]

```
MPIw_register_type (
    std::complex< long double > ,
    MPI_CXX_LONG_DOUBLE_COMPLEX )
```

6.7.2.13 MPIw_register_type() [13/17]

```
MPIw_register_type (
    unsigned char ,
    MPI_UNSIGNED_CHAR )
```

6.7.2.14 MPIw_register_type() [14/17]

```
MPIw_register_type (
    unsigned long ,
    MPI_UNSIGNED_LONG )
```

6.7.2.15 MPIw_register_type() [15/17]

```
MPIw_register_type (
    unsigned short ,
    MPI_UNSIGNED_SHORT )
```

6.7.2.16 MPIw_register_type() [16/17]

```
MPIw_register_type (
    unsigned ,
    MPI_UNSIGNED )
```

6.7.2.17 MPIw_register_type() [17/17]

```
MPIw_register_type (
    wchar_t ,
    MPI_WCHAR )
```

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