

UNAT

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# Chapter 1

## Class Index

### 1.1 Class Hierarchy

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# Chapter 2

## Class Index

### 2.1 Class List

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

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# Chapter 3

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# Chapter 4

## Class Documentation

### 4.1 \_\_attribute\_\_ Struct Reference

```
#include <RlmpiSharedType.h>
```

#### Public Attributes

- int [nPUTR](#)
- int [nGETC](#)
- int [nGETR\\_PUTC](#)
- int [nGetrSameRow](#)
- int [nPutrSameRow](#)
- int [nGetcSameCol](#)
- int [nPutcSameCol](#)
- [sReal data](#) [6]
- unsigned [res\\_pos](#): 16
- unsigned [src\\_id](#): 8
- unsigned [dst\\_id](#): 8
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- unsigned [indP](#): 16

### 4.1.1 Member Data Documentation

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4.1.1.2 `unsigned __attribute__::dst_id`

4.1.1.3 `unsigned __attribute__::indM`

4.1.1.4 `unsigned __attribute__::indP`

4.1.1.5 `int __attribute__::nGETC`

4.1.1.6 `int __attribute__::nGetcSameCol`

4.1.1.7 `int __attribute__::nGETR_PUTC`

4.1.1.8 `int __attribute__::nGetrSameRow`

4.1.1.9 `int __attribute__::nPutcSameCol`

4.1.1.10 `int __attribute__::nPUTR`

4.1.1.11 `int __attribute__::nPutrSameRow`

4.1.1.12 `unsigned __attribute__::res_pos`

4.1.1.13 `unsigned __attribute__::src_id`

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

- [RL\\_MPI/RlmpiSharedType.h](#)



## 4.2 Arrays Struct Reference

```
#include <iterator_struct.h>
```

### Public Attributes

- [swFloat \\* A1Ptr](#)
- [swFloat \\* A2Ptr](#)
- [swFloat \\* A3Ptr](#)
- [swFloat \\* A4Ptr](#)
- [swInt num](#)

### 4.2.1 Member Data Documentation

**4.2.1.1** [swFloat\\* Arrays::A1Ptr](#)

**4.2.1.2** [swFloat\\* Arrays::A2Ptr](#)

**4.2.1.3** [swFloat\\* Arrays::A3Ptr](#)

**4.2.1.4** [swFloat\\* Arrays::A4Ptr](#)

**4.2.1.5** [swInt Arrays::num](#)

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

- [iterator/iterator\\_struct.h](#)

## 4.3 e2VParas Struct Reference

```
#include <edge2VertexIter_host.h>
```

### Public Attributes

- [MLBParameters](#) \* [MLBParas](#)
- [swFloat](#) \* [lower](#)
- [swFloat](#) \* [upper](#)
- [swFloat](#) \* [x](#)
- [swFloat](#) \* [b](#)
- [swFloat](#) \* [diag](#)
- [swInt](#) \* [isXExist](#)

### 4.3.1 Member Data Documentation

**4.3.1.1** [swFloat\\*](#) [e2VParas::b](#)

**4.3.1.2** [swFloat\\*](#) [e2VParas::diag](#)

**4.3.1.3** [swInt\\*](#) [e2VParas::isXExist](#)

**4.3.1.4** [swFloat\\*](#) [e2VParas::lower](#)

**4.3.1.5** [MLBParameters\\*](#) [e2VParas::MLBParas](#)

**4.3.1.6** [swFloat\\*](#) [e2VParas::upper](#)

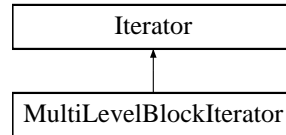
**4.3.1.7** [swFloat\\*](#) [e2VParas::x](#)

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

- [iterator/multiLevelBlockIterator/edge2VertexIter/edge2VertexIter\\_host.h](#)

## 4.4 Iterator Class Reference

`#include <iterator.H>` Inheritance diagram for `Iterator`:



### Public Member Functions

- [Iterator](#) ()
- [Iterator](#) ([Topology](#) &topo)
- [~Iterator](#) ()
- void [reformInnerTopology](#) ()
- map< [swInt](#), [swInt](#) > & [getEdgeMap](#) ()
- map< [swInt](#), [swInt](#) > & [getVertexMap](#) ()
- virtual void [reorderEdgesFromEdge](#) ([swInt](#) \*startVertices, [swInt](#) \*endVertices, [swInt](#) edgeNumber, [swInt](#) vertexNumber)=0
- virtual void [reorderEdgesFromVertex](#) ([swInt](#) \*firstEdgeVertices, [swInt](#) \*vertexNeighbours, [swInt](#) edgeNumber, [swInt](#) vertexNumber)=0
- virtual void [reorderEdgeData](#) ([Arrays](#) \*edgeData)=0
- virtual void [reorderEdgeDataUnsymm](#) ([Arrays](#) \*edgeData)=0
- virtual void [reorderVertexData](#) ([Arrays](#) \*edgeData)=0
- virtual void [edge2VertexIteration](#) ([Arrays](#) \*edgeData, [Arrays](#) \*vertexData, void(\*[operatorFunPointer\\_host](#))([MLBFunParameters](#) \*MLBFunParas), void(\*[operatorFunPointer\\_slave](#))([MLBFunParameters](#) \*MLBFunParas))=0
- virtual void [vertex2EdgeIteration](#) ([Arrays](#) \*neighbourData, [Arrays](#) \*vertexData, void(\*[operatorFunPointer\\_host](#))([MLBFunParameters](#) \*MLBFunParas), void(\*[operatorFunPointer\\_slave](#))([MLBFunParameters](#) \*MLBFunParas))=0

### Protected Member Functions

- [Topology](#) \* [getTopology](#) ()

### Private Attributes

- [Topology](#) \* [\\_topo](#)
- map< [swInt](#), [swInt](#) > [\\_edgeMap](#)
- map< [swInt](#), [swInt](#) > [\\_vertexMap](#)

## 4.4.1 Constructor & Destructor Documentation

4.4.1.1 `Iterator::Iterator () [inline]`

4.4.1.2 `Iterator::Iterator (Topology & topo) [inline]`

4.4.1.3 `Iterator::~~Iterator () [inline]`

## 4.4.2 Member Function Documentation

4.4.2.1 `virtual void Iterator::edge2VertexIteration (Arrays * edgeData, Arrays * vertexData, void(*) (MLBFunParameters *MLBFunParas) operatorFunPointer_host, void(*) (MLBFunParameters *MLBFunParas) operatorFunPointer_slave) [pure virtual]`

Implemented in [MultiLevelBlockIterator](#).

4.4.2.2 `map<swInt, swInt>& Iterator::getEdgeMap () [inline]`

4.4.2.3 `Topology* Iterator::getTopology () [inline, protected]`

4.4.2.4 `map<swInt, swInt>& Iterator::getVertexMap () [inline]`

4.4.2.5 `void Iterator::reformInnerTopology () [inline]`

4.4.2.6 `virtual void Iterator::reorderEdgeData (Arrays * edgeData) [pure virtual]`

Implemented in [MultiLevelBlockIterator](#).

4.4.2.7 `virtual void Iterator::reorderEdgeDataUnsymm (Arrays * edgeData) [pure virtual]`

Implemented in [MultiLevelBlockIterator](#).

4.4.2.8 `virtual void Iterator::reorderEdgesFromEdge (swInt * startVertices, swInt * endVertices, swInt edgeNumber, swInt vertexNumber) [pure virtual]`

Implemented in [MultiLevelBlockIterator](#).

4.4.2.9 `virtual void Iterator::reorderEdgesFromVertex (swInt * firstEdgeVertices, swInt * vertexNeighbours, swInt edgeNumber, swInt vertexNumber) [pure virtual]`

Implemented in [MultiLevelBlockIterator](#).

4.4.2.10 `virtual void Iterator::reorderVertexData (Arrays * edgeData) [pure virtual]`

Implemented in [MultiLevelBlockIterator](#).

**4.4.2.11** `virtual void Iterator::vertex2EdgeIteration (Arrays * neighbourData, Arrays * vertexData, void(*) (MLBFunParameters *MLBFunParas) operatorFunPointer_host, void(*) (MLBFunParameters *MLBFunParas) operatorFunPointer_slave) [pure virtual]`

Implemented in [MultiLevelBlockIterator](#).

### 4.4.3 Member Data Documentation

**4.4.3.1** `map<swInt, swInt> Iterator::_edgeMap [private]`

**4.4.3.2** `Topology* Iterator::_topo [private]`

**4.4.3.3** `map<swInt, swInt> Iterator::_vertexMap [private]`

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

- [iterator/iterator.H](#)

## 4.5 MLBFunParameters Struct Reference

```
#include <iterator_struct.h>
```

### Public Attributes

- [Arrays](#) \* [edgeData](#)
- [Arrays](#) \* [vertexData](#)
- [topoArrays](#) \* [tArrays](#)
- [swInt](#) count
- [swInt](#) k1
- [swInt](#) k2
- [swInt](#) flag

### 4.5.1 Member Data Documentation

**4.5.1.1** [swInt MLBFunParameters::count](#)

**4.5.1.2** [Arrays\\*](#) [MLBFunParameters::edgeData](#)

**4.5.1.3** [swInt MLBFunParameters::flag](#)

**4.5.1.4** [swInt MLBFunParameters::k1](#)

**4.5.1.5** [swInt MLBFunParameters::k2](#)

**4.5.1.6** [topoArrays\\*](#) [MLBFunParameters::tArrays](#)

**4.5.1.7** [Arrays\\*](#) [MLBFunParameters::vertexData](#)

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

- [iterator/iterator\\_struct.h](#)

## 4.6 MLBParameters Struct Reference

```
#include <iterator_struct.h>
```

### Public Attributes

- [swInt \\* blockStarts](#)
- [swInt \\* blockStartsUnsymm](#)
- [swInt \\* vertexStarts](#)
- [swInt \\* owner](#)
- [swInt \\* neighbor](#)
- [swInt \\* firstEdgeVertices](#)
- [swInt \\* vertexNeighbor](#)
- [swInt cpeBlockNum](#)
- [swInt mshBlockNum](#)
- [swInt mtxBlockNum](#)
- [swInt maxXNum](#)
- [swInt maxCells](#)
- [swInt maxEdges](#)
- [void\(\\* operatorFunPointer\\_host \)\(MLBParameters \\*MLBFunParas\)](#)
- [void\(\\* operatorFunPointer\\_slave \)\(MLBParameters \\*MLBFunParas\)](#)

### 4.6.1 Member Data Documentation

- 4.6.1.1 `swInt* MLBParameters::blockStarts`
- 4.6.1.2 `swInt* MLBParameters::blockStartsUnsymm`
- 4.6.1.3 `swInt MLBParameters::cpeBlockNum`
- 4.6.1.4 `swInt* MLBParameters::firstEdgeVertices`
- 4.6.1.5 `swInt MLBParameters::maxCells`
- 4.6.1.6 `swInt MLBParameters::maxEdges`
- 4.6.1.7 `swInt MLBParameters::maxXNum`
- 4.6.1.8 `swInt MLBParameters::mshBlockNum`
- 4.6.1.9 `swInt MLBParameters::mtxBlockNum`
- 4.6.1.10 `swInt* MLBParameters::neighbor`
- 4.6.1.11 `void(* MLBParameters::operatorFunPointer_host)(MLBFunParameters *MLBFunParas)`
- 4.6.1.12 `void(* MLBParameters::operatorFunPointer_slave)(MLBFunParameters *MLBFunParas)`
- 4.6.1.13 `swInt* MLBParameters::owner`
- 4.6.1.14 `swInt* MLBParameters::vertexNeighbor`
- 4.6.1.15 `swInt* MLBParameters::vertexStarts`

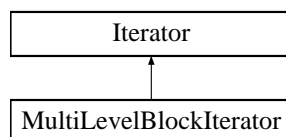
The documentation for this struct was generated from the following file:

- [iterator/iterator\\_struct.h](#)



## 4.7 MultiLevelBlockIterator Class Reference

#include <multiLevelBlockIterator.H> Inheritance diagram for MultiLevelBlockIterator::



### Public Member Functions

- [MultiLevelBlockIterator](#) ([Topology](#) &topo)
- [~MultiLevelBlockIterator](#) ()
- void [reorderEdgesFromEdge](#) ([swInt](#) \*startVertices, [swInt](#) \*endVertices, [swInt](#) edgeNumber, [swInt](#) vertexNumber)
- void [reorderEdgesFromVertex](#) ([swInt](#) \*firstEdgeVertices, [swInt](#) \*vertexNeighbours, [swInt](#) edgeNumber, [swInt](#) vertexNumber)
- void [edge2VertexIteration](#) ([Arrays](#) \*edgeData, [Arrays](#) \*vertexData, void(\*[operatorFunPointer\\_host](#))([MLBFunParameters](#) \*MLBFunParas), void(\*[operatorFunPointer\\_slave](#))([MLBFunParameters](#) \*MLBFunParas))
- void [vertex2EdgeIteration](#) ([Arrays](#) \*neighbourData, [Arrays](#) \*vertexData, void(\*[operatorFunPointer\\_host](#))([MLBFunParameters](#) \*MLBFunParas), void(\*[operatorFunPointer\\_slave](#))([MLBFunParameters](#) \*MLBFunParas))
- void [reorderEdgeData](#) ([Arrays](#) \*edgeData)
- void [reorderEdgeDataUnsymm](#) ([Arrays](#) \*edgeData)
- void [reorderVertexData](#) ([Arrays](#) \*edgeData)
- [swInt](#) [getCpeBlockNum](#) ()
- [swInt](#) [getMshBlockNum](#) ()
- [swInt](#) [getMtxBlockNum](#) ()
- [swInt](#) [getMaxXNum](#) ()
- [swInt](#) [getMaxCells](#) ()
- [swInt](#) [getMaxEdges](#) ()
- [swInt](#) [getMaxEdgesUnsymm](#) ()
- [swInt](#) \* [getBlockStarts](#) ()
- [swInt](#) \* [getBlockStartsUnsymm](#) ()
- [swInt](#) \* [getVertexStarts](#) ()

### Private Member Functions

- void [reorderVertexArray](#) ([swFloat](#) \*array)
- void [reorderEdgeArrayUnsymm](#) ([swFloat](#) \*array)
- void [MLBReorder](#) ([Topology](#) &topo, [swInt](#) ref)

## Private Attributes

- [swInt \\_cpeBlockNum](#)
- [swInt \\_mshBlockNum](#)
- [swInt \\_mtxBlockNum](#)
- [swInt \\* \\_blockStarts](#)
- [swInt \\* \\_blockStartsUnsymm](#)
- [swInt \\* \\_vertexStarts](#)
- [swInt \\_maxXNum](#)
- [swInt \\_maxCells](#)
- [swInt \\_maxEdges](#)
- [swInt \\_maxEdgesUnsymm](#)
- [swInt \\* \\_owner](#)
- [swInt \\* \\_neighbor](#)
- [swInt \\* \\_postEdgeOrder](#)
- [swInt \\* \\_postVertexOrder](#)
- [swInt \\* \\_firstEdgeVertices](#)
- [swInt \\* \\_vertexNeighbours](#)

## 4.7.1 Constructor & Destructor Documentation

4.7.1.1 [MultiLevelBlockIterator::MultiLevelBlockIterator \(Topology & \*topo\*\)](#)

4.7.1.2 [MultiLevelBlockIterator::~~MultiLevelBlockIterator \(\)](#) `[inline]`

## 4.7.2 Member Function Documentation

4.7.2.1 [void MultiLevelBlockIterator::edge2VertexIteration \(Arrays \\* \*edgeData\*, Arrays \\* \*vertexData\*, void\(\\*\) \(MLBFunParameters \\*MLBFunParas\) \*operatorFunPointer\\_host\*, void\(\\*\) \(MLBFunParameters \\*MLBFunParas\) \*operatorFunPointer\\_slave\*\)](#) `[virtual]`

Implements [Iterator](#).

- 4.7.2.2 `swInt* MultiLevelBlockIterator::getBlockStarts () [inline]`
- 4.7.2.3 `swInt* MultiLevelBlockIterator::getBlockStartsUnsymm () [inline]`
- 4.7.2.4 `swInt MultiLevelBlockIterator::getCpeBlockNum () [inline]`
- 4.7.2.5 `swInt MultiLevelBlockIterator::getMaxCells () [inline]`
- 4.7.2.6 `swInt MultiLevelBlockIterator::getMaxEdges () [inline]`
- 4.7.2.7 `swInt MultiLevelBlockIterator::getMaxEdgesUnsymm () [inline]`
- 4.7.2.8 `swInt MultiLevelBlockIterator::getMaxXNum () [inline]`
- 4.7.2.9 `swInt MultiLevelBlockIterator::getMshBlockNum () [inline]`
- 4.7.2.10 `swInt MultiLevelBlockIterator::getMtxBlockNum () [inline]`
- 4.7.2.11 `swInt* MultiLevelBlockIterator::getVertexStarts () [inline]`
- 4.7.2.12 `void MultiLevelBlockIterator::MLBReorder (Topology & topo, swInt ref) [private]`
- 4.7.2.13 `void MultiLevelBlockIterator::reorderEdgeArrayUnsymm (swFloat * array) [private]`
- 4.7.2.14 `void MultiLevelBlockIterator::reorderEdgeData (Arrays * edgeData) [virtual]`

Implements [Iterator](#).

- 4.7.2.15 `void MultiLevelBlockIterator::reorderEdgeDataUnsymm (Arrays * edgeData) [virtual]`

Implements [Iterator](#).

- 4.7.2.16 `void MultiLevelBlockIterator::reorderEdgesFromEdge (swInt * startVertices, swInt * endVertices, swInt edgeNumber, swInt vertexNumber) [virtual]`

Implements [Iterator](#).

- 4.7.2.17 `void MultiLevelBlockIterator::reorderEdgesFromVertex (swInt * firstEdgeVertices, swInt * vertexNeighbours, swInt edgeNumber, swInt vertexNumber) [virtual]`

Implements [Iterator](#).

- 4.7.2.18 `void MultiLevelBlockIterator::reorderVertexArray (swFloat * array) [private]`
- 4.7.2.19 `void MultiLevelBlockIterator::reorderVertexData (Arrays * edgeData) [virtual]`

Implements [Iterator](#).

**4.7.2.20** `void MultiLevelBlockIterator::vertex2EdgeIteration (Arrays * neighbourData, Arrays * vertexData, void(*) (MLBFunParameters *MLBFunParas) operatorFunPointer_host, void(*) (MLBFunParameters *MLBFunParas) operatorFunPointer_slave)` **[virtual]**

Implements [Iterator](#).

### 4.7.3 Member Data Documentation

**4.7.3.1** `swInt* MultiLevelBlockIterator::_blockStarts` **[private]**

**4.7.3.2** `swInt* MultiLevelBlockIterator::_blockStartsUnsymm` **[private]**

**4.7.3.3** `swInt MultiLevelBlockIterator::_cpeBlockNum` **[private]**

**4.7.3.4** `swInt* MultiLevelBlockIterator::_firstEdgeVertices` **[private]**

**4.7.3.5** `swInt MultiLevelBlockIterator::_maxCells` **[private]**

**4.7.3.6** `swInt MultiLevelBlockIterator::_maxEdges` **[private]**

**4.7.3.7** `swInt MultiLevelBlockIterator::_maxEdgesUnsymm` **[private]**

**4.7.3.8** `swInt MultiLevelBlockIterator::_maxXNum` **[private]**

**4.7.3.9** `swInt MultiLevelBlockIterator::_mshBlockNum` **[private]**

**4.7.3.10** `swInt MultiLevelBlockIterator::_mtxBlockNum` **[private]**

**4.7.3.11** `swInt* MultiLevelBlockIterator::_neighbor` **[private]**

**4.7.3.12** `swInt* MultiLevelBlockIterator::_owner` **[private]**

**4.7.3.13** `swInt* MultiLevelBlockIterator::_postEdgeOrder` **[private]**

**4.7.3.14** `swInt* MultiLevelBlockIterator::_postVertexOrder` **[private]**

**4.7.3.15** `swInt* MultiLevelBlockIterator::_vertexNeighbours` **[private]**

**4.7.3.16** `swInt* MultiLevelBlockIterator::_vertexStarts` **[private]**

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

- iterator/multiLevelBlockIterator/[multiLevelBlockIterator.H](#)
- iterator/multiLevelBlockIterator/[multiLevelBlockIterator.C](#)

## 4.8 RlmpiInitializer Class Reference

```
#include <RlmpiInitializer.hpp>
```

### Public Member Functions

- [RlmpiInitializer](#) ()
- void [generate\\_data](#) ()
- void [generate\\_data\\_un\\_col\\_row](#) (const vector< vector< [int8LDM](#) > > &[not\\_col\\_row\\_dst](#))
- void [generate\\_data\\_un\\_col\\_row](#) (const vector< vector< [int8LDM](#) > > &[not\\_col\\_row\\_dst](#), const vector< vector< [int8LDM](#) > > &[not\\_col\\_row\\_Ndata](#))
- void [generate\\_table](#) ()
- void [reorder\\_packages](#) ()
- void [generate\\_schedule](#) ()
- void [reorder\\_packages2](#) ()
- void [generate\\_data\\_same\\_row](#) ()
- void [generate\\_data\\_same\\_row](#) (const vector< vector< [int8LDM](#) > > &[not\\_col\\_row\\_dst](#), const vector< vector< [int8LDM](#) > > &[nData](#))
- void [reorder\\_packages\\_same\\_row](#) ()
- void [generate\\_table\\_same\\_row](#) ()
- void [generate\\_schedule\\_same\\_row](#) ()
- void [generate\\_data\\_same\\_col](#) ()
- void [generate\\_data\\_same\\_col](#) (const vector< vector< [int8LDM](#) > > &[not\\_col\\_row\\_dst](#), const vector< vector< [int8LDM](#) > > &[nData](#))
- void [reorder\\_packages\\_same\\_col](#) ()
- void [generate\\_table\\_same\\_col](#) ()
- void [generate\\_schedule\\_same\\_col](#) ()
- void [assemble\\_packages](#) ()
- void [transpose\\_matrix](#) (vector< [Pack](#) > &[pack](#))
- void [write\\_packages](#) ()
- void [write\\_schedule](#) ()
- void [generate\\_rcv\\_position](#) ()
- void [init](#) (const vector< vector< [ThreadID](#) > > &[sendDstLists](#))
- void [copyinfo](#) ([Schedule](#) \*[reg\\_data](#))

### Public Attributes

- Table [table](#) [64]
- vector< vector< [int8LDM](#) > > [putr\\_schedules](#)
- vector< vector< [int8LDM](#) > > [getrputc\\_schedules](#)
- vector< vector< [int8LDM](#) > > [getc\\_schedules](#)
- vector< vector< [Pack](#) > > [res\\_packages](#)
- vector< vector< [Pack](#) > > [res\\_packages\\_same\\_col](#)
- vector< vector< [Pack](#) > > [res\\_packages\\_same\\_row](#)
- vector< vector< [Pack](#) > > [all\\_res\\_packages](#)
- vector< vector< [int8LDM](#) > > [putr\\_schedules\\_same\\_row](#)
- vector< vector< [int8LDM](#) > > [getr\\_schedules\\_same\\_row](#)
- vector< vector< [int8LDM](#) > > [putc\\_schedules\\_same\\_col](#)
- vector< vector< [int8LDM](#) > > [getc\\_schedules\\_same\\_col](#)

## Static Public Attributes

- static const int [nThread](#) = 64
- static const int [maxNPack](#) = 10
- static const int [maxNdst](#) = 49
- static const int [nSameRow](#) = 7
- static const int [nSameCol](#) = 7

## Protected Member Functions

- vector< int > [get\\_destination\\_pool](#) (int myId)
- void [generate\\_dst\\_sequence](#) ()

## Protected Attributes

- vector< vector< int > > [destination\\_pool](#)
- vector< map< int, vector< Pack > > > [packages](#)
- vector< map< int, vector< Pack > > > [non\\_same\\_col\\_row\\_packages](#)
- vector< map< int, vector< Pack > > > [same\\_col\\_packages](#)
- vector< map< int, vector< Pack > > > [same\\_row\\_packages](#)
- vector< map< int, vector< Pack > > > [all\\_packages](#)
- int [dst\\_sequence](#) [64][64]
- vector< vector< [int8LDM](#) > > [same\\_row\\_Ndata](#)
- vector< vector< [int8LDM](#) > > [same\\_col\\_Ndata](#)
- vector< vector< [int8LDM](#) > > [not\\_col\\_row\\_Ndata](#)
- vector< vector< [int8LDM](#) > > [same\\_row\\_dst](#)
- vector< vector< [int8LDM](#) > > [same\\_col\\_dst](#)
- vector< vector< [int8LDM](#) > > [not\\_col\\_row\\_dst](#)

## Static Protected Attributes

- static const int [nRecReg](#) = 7
- static const int [nSendReg](#) = 7

## Friends

- void [generate\\_register\\_transform\\_table](#) (int(\*dst\_list)[64], int(\*sendN)[64], Table \*[table](#))
- void [generate\\_register\\_transform\\_table\\_same\\_row](#) (const int(\*dst\_list)[64], const int(\*sendN)[64], Table \*[table](#))
- void [generate\\_register\\_transform\\_table\\_same\\_col](#) (int(\*dst\_list)[64], int(\*sendN)[64], Table \*[table](#))

## 4.8.1 Constructor & Destructor Documentation

4.8.1.1 `RlmpiInitializer::RlmpiInitializer ()`

## 4.8.2 Member Function Documentation

4.8.2.1 `void RlmpiInitializer::assemble_packages ()`

4.8.2.2 `void RlmpiInitializer::copyinfo (Schedule * reg_data)`

4.8.2.3 `void RlmpiInitializer::generate_data ()`

4.8.2.4 `void RlmpiInitializer::generate_data_same_col (const vector< vector< int8LDM > > & not_col_row_dst, const vector< vector< int8LDM > > & nData)`

4.8.2.5 `void RlmpiInitializer::generate_data_same_col ()`

4.8.2.6 `void RlmpiInitializer::generate_data_same_row (const vector< vector< int8LDM > > & not_col_row_dst, const vector< vector< int8LDM > > & nData)`

4.8.2.7 `void RlmpiInitializer::generate_data_same_row ()`

4.8.2.8 `void RlmpiInitializer::generate_data_un_col_row (const vector< vector< int8LDM > > & not_col_row_dst, const vector< vector< int8LDM > > & not_col_row_Ndata)`

4.8.2.9 `void RlmpiInitializer::generate_data_un_col_row (const vector< vector< int8LDM > > & not_col_row_dst)`

4.8.2.10 `void RlmpiInitializer::generate_dst_sequence ()` `[protected]`

FOR TEST

- 4.8.2.11 void RlmpiInitializer::generate\_recv\_position ()
- 4.8.2.12 void RlmpiInitializer::generate\_schedule ()
- 4.8.2.13 void RlmpiInitializer::generate\_schedule\_same\_col ()
- 4.8.2.14 void RlmpiInitializer::generate\_schedule\_same\_row ()
- 4.8.2.15 void RlmpiInitializer::generate\_table ()
- 4.8.2.16 void RlmpiInitializer::generate\_table\_same\_col ()
- 4.8.2.17 void RlmpiInitializer::generate\_table\_same\_row ()
- 4.8.2.18 vector< int > RlmpiInitializer::get\_destination\_pool (int *myId*) [protected]
- 4.8.2.19 void RlmpiInitializer::init (const vector< vector< ThreadID > > & *sendDstLists*)
- 4.8.2.20 void RlmpiInitializer::reorder\_packages ()
- 4.8.2.21 void RlmpiInitializer::reorder\_packages2 ()

exchange package

- 4.8.2.22 void RlmpiInitializer::reorder\_packages\_same\_col ()
- 4.8.2.23 void RlmpiInitializer::reorder\_packages\_same\_row ()
- 4.8.2.24 void RlmpiInitializer::transpose\_matrix (vector< Pack > & *pack*)
- 4.8.2.25 void RlmpiInitializer::write\_packages ()
- 4.8.2.26 void RlmpiInitializer::write\_schedule ()

### 4.8.3 Friends And Related Function Documentation

- 4.8.3.1 void generate\_register\_transform\_table (int(\*) *dst\_list*[64], int(\*) *sendN*[64], Table \* *table*) [friend]
- 4.8.3.2 void generate\_register\_transform\_table\_same\_col (int(\*) *dst\_list*[64], int(\*) *sendN*[64], Table \* *table*) [friend]

for test////

- 4.8.3.3 void generate\_register\_transform\_table\_same\_row (const int(\*) *dst\_list*[64], const int(\*) *sendN*[64], Table \* *table*) [friend]

for test////





## 4.8.4 Member Data Documentation

4.8.4.1 `vector<map<int, vector<Pack> > > RlmpiInitializer::all_packages` [protected]

4.8.4.2 `vector<vector<Pack> > RlmpiInitializer::all_res_packages`

4.8.4.3 `vector<vector<int> > RlmpiInitializer::destination_pool` [protected]

4.8.4.4 `int RlmpiInitializer::dst_sequence[64][64]` [protected]

4.8.4.5 `vector<vector<int8LDM> > RlmpiInitializer::getc_schedules`

4.8.4.6 `vector<vector<int8LDM> > RlmpiInitializer::getc_schedules_same_col`

4.8.4.7 `vector<vector<int8LDM> > RlmpiInitializer::getr_schedules_same_row`

4.8.4.8 `vector<vector<int8LDM> > RlmpiInitializer::getrputc_schedules`

4.8.4.9 `const int RlmpiInitializer::maxNdst = 49` [static]

4.8.4.10 `const int RlmpiInitializer::maxNPack = 10` [static]

4.8.4.11 `vector<map<int, vector<Pack> > > RlmpiInitializer::non_same_col_row_packages` [protected]

4.8.4.12 `vector<vector<int8LDM> > RlmpiInitializer::not_col_row_dst` [protected]

4.8.4.13 `vector<vector<int8LDM> > RlmpiInitializer::not_col_row_Ndata` [protected]

4.8.4.14 `const int RlmpiInitializer::nRecReg = 7` [static, protected]

4.8.4.15 `const int RlmpiInitializer::nSameCol = 7` [static]

4.8.4.16 `const int RlmpiInitializer::nSameRow = 7` [static]

4.8.4.17 `const int RlmpiInitializer::nSendReg = 7` [static, protected]

4.8.4.18 `const int RlmpiInitializer::nThread = 64` [static]

4.8.4.19 `vector<map<int, vector<Pack> > > RlmpiInitializer::packages` [protected]

4.8.4.20 `vector<vector<int8LDM> > RlmpiInitializer::putc_schedules_same_col`

4.8.4.21 `vector<vector<int8LDM> > RlmpiInitializer::putr_schedules`

4.8.4.22 `vector<vector<int8LDM> > RlmpiInitializer::putr_schedules_same_row`

4.8.4.23 `vector<vector<Pack> > RlmpiInitializer::res_packages`

4.8.4.24 `vector<vector<Pack> > RlmpiInitializer::res_packages_same_col`

4.8.4.25 `vector<vector<Pack> > RlmpiInitializer::res_packages_same_row`

4.8.4.26 `vector<vector<int8LDM> > RlmpiInitializer::same_col_dst` [protected]

4.8.4.27 `vector<vector<int8LDM> > RlmpiInitializer::same_col_Ndata` [protected]

4.8.4.28 `vector<map<int, vector<Pack> > > RlmpiInitializer::same_col_packages` [protected]

4.8.4.29 `vector<vector<int8LDM> > RlmpiInitializer::same_row_dst` [protected]

- [RL\\_MPI/RmpiInitializer.hxx](#)
- [RL\\_MPI/RmpiInitializer.cxx](#)

## 4.9 Schedule Struct Reference

```
#include <RlmpiSharedType.h>
```

### Public Attributes

- Table [table](#) [64]
- Pack \* [package](#) [64]
- int [nCycle](#)
- int8LDM \* [putr\\_schedules](#) [64]
- int8LDM \* [getrputc\\_schedules](#) [64]
- int8LDM \* [getc\\_schedules](#) [64]
- int [nCycleSameRow](#)
- int8LDM \* [putr\\_schedules\\_same\\_row](#) [64]
- int8LDM \* [getr\\_schedules\\_same\\_row](#) [64]
- int [nCycleSameCol](#)
- int8LDM \* [putc\\_schedules\\_same\\_col](#) [64]
- int8LDM \* [getc\\_schedules\\_same\\_col](#) [64]
- int [destroy](#)

### 4.9.1 Member Data Documentation

**4.9.1.1** int [Schedule::destroy](#)

**4.9.1.2** int8LDM\* [Schedule::getc\\_schedules](#)[64]

**4.9.1.3** int8LDM\* [Schedule::getc\\_schedules\\_same\\_col](#)[64]

**4.9.1.4** int8LDM\* [Schedule::getr\\_schedules\\_same\\_row](#)[64]

**4.9.1.5** int8LDM\* [Schedule::getrputc\\_schedules](#)[64]

**4.9.1.6** int [Schedule::nCycle](#)

**4.9.1.7** int [Schedule::nCycleSameCol](#)

**4.9.1.8** int [Schedule::nCycleSameRow](#)

**4.9.1.9** Pack\* [Schedule::package](#)[64]

**4.9.1.10** int8LDM\* [Schedule::putc\\_schedules\\_same\\_col](#)[64]

**4.9.1.11** int8LDM\* [Schedule::putr\\_schedules](#)[64]

**4.9.1.12** int8LDM\* [Schedule::putr\\_schedules\\_same\\_row](#)[64]

**4.9.1.13** Table [Schedule::table](#)[64]

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

- [RL\\_MPI/RlmpiSharedType.h](#)

## 4.10 struct\_extensibleLABELArray Struct Reference

```
#include <extensibleLabelArray.h>
```

### Public Attributes

- LABEL \* [data](#)
- LABEL [size](#)
- LABEL [maxSize](#)

### 4.10.1 Member Data Documentation

#### 4.10.1.1 LABEL \* struct\_extensibleLABELArray::data

#### 4.10.1.2 LABEL struct\_extensibleLABELArray::maxSize

#### 4.10.1.3 LABEL struct\_extensibleLABELArray::size

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

- iterator/multiLevelBlockIterator/BlockOrdering/[extensibleLabelArray.h](#)
- iterator/multiLevelBlockIterator/extensibleArray/[extensibleLabelArray.h](#)

## 4.11 struct\_extensibleSCALARArray Struct Reference

```
#include <extensibleScalarArray.h>
```

### Public Attributes

- SCALAR \* [data](#)
- LABEL [size](#)
- LABEL [maxSize](#)

### 4.11.1 Member Data Documentation

**4.11.1.1** SCALAR\* struct\_extensibleSCALARArray::data

**4.11.1.2** LABEL struct\_extensibleSCALARArray::maxSize

**4.11.1.3** LABEL struct\_extensibleSCALARArray::size

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

- iterator/multiLevelBlockIterator/extensibleArray/[extensibleScalarArray.h](#)

## 4.12 struct\_MLB\_graph Struct Reference

```
#include <BlockOrdering.h>
```

### Public Attributes

- LABEL \* [owner](#)
- LABEL \* [neighbor](#)
- LABEL \* [cellWeights](#)
- LABEL \* [edgeWeights](#)
- LABEL [cellNum](#)
- LABEL [edgeNum](#)

### 4.12.1 Member Data Documentation

**4.12.1.1 LABEL struct\_MLB\_graph::cellNum**

**4.12.1.2 LABEL\* struct\_MLB\_graph::cellWeights**

**4.12.1.3 LABEL struct\_MLB\_graph::edgeNum**

**4.12.1.4 LABEL\* struct\_MLB\_graph::edgeWeights**

**4.12.1.5 LABEL\* struct\_MLB\_graph::neighbor**

**4.12.1.6 LABEL\* struct\_MLB\_graph::owner**

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

- [iterator/multiLevelBlockIterator/BlockOrdering/BlockOrdering.h](#)

## 4.13 topoArrays Struct Reference

```
#include <iterator_struct.h>
```

### Public Attributes

- [swInt](#) \* [sOwner](#)
- [swInt](#) \* [rOwner](#)
- [swInt](#) \* [sNeighbor](#)
- [swInt](#) \* [rNeighbor](#)
- [swInt](#) \* [diagOwner](#)
- [swInt](#) \* [diagNeighbor](#)

### 4.13.1 Member Data Documentation

**4.13.1.1** [swInt](#)\* [topoArrays::diagNeighbor](#)

**4.13.1.2** [swInt](#)\* [topoArrays::diagOwner](#)

**4.13.1.3** [swInt](#)\* [topoArrays::rNeighbor](#)

**4.13.1.4** [swInt](#)\* [topoArrays::rOwner](#)

**4.13.1.5** [swInt](#)\* [topoArrays::sNeighbor](#)

**4.13.1.6** [swInt](#)\* [topoArrays::sOwner](#)

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

- [iterator/iterator\\_struct.h](#)



## 4.14 Topology Class Reference

```
#include <topology.H>
```

### Public Member Functions

- [Topology](#) ()
- [Topology](#) (const [Topology](#) &topo)
- [~Topology](#) ()
- [swInt](#) [getVertexNumber](#) ()
- [swInt](#) [getEdgeNumber](#) ()
- [swInt](#) \* [getStartVertices](#) ()
- [swInt](#) \* [getEndVertices](#) ()
- [swInt](#) \* [getStartVertexNumbers](#) ()
- [swInt](#) \* [getAccuStartVertexNumbers](#) ()
- [swInt](#) \* [getFirstEdgeVertices](#) ()
- [swInt](#) \* [getVertexNeighbours](#) ()
- [swInt](#) \* [getVertexEdgeNumbers](#) ()
- [swInt](#) \* [getAccuVertexEdgeNumbers](#) ()
- [Topology](#) & [operator=](#) (const [Topology](#) &topo)
- [Topology](#) \* [clone](#) () const
- void [addEdge](#) ()
- void [addVertex](#) ()
- void [removeEdge](#) ()
- void [removeVertex](#) ()
- void [transpose](#) ()
- void [sortAndCompress](#) ()
- void [edgeBasedToVertexBased](#) ()
- void [vertexBasedToEdgeBased](#) ()

### Static Public Member Functions

- static [Topology](#) [constructFromEdge](#) ([swInt](#) \*startVertices, [swInt](#) \*endVertices, [swInt](#) edgeNumber, bool copy=false)
- static [Topology](#) [constructFromVertex](#) ([swInt](#) \*accuVertexEdgeNumbers, [swInt](#) \*vertexNeighbours, [swInt](#) vertexNumber, bool copy=false)

### Private Member Functions

- void [EdgeBasedInit](#) ()
- void [VertexBasedInit](#) ()
- void [copy](#) (const [Topology](#) &topo)

## Private Attributes

- [swInt \\_vertexNumber](#)
- [swInt \\_edgeNumber](#)
- [swInt \\* \\_startVertices](#)
- [swInt \\* \\_endVertices](#)
- [swInt \\* \\_startVertexNumbers](#)
- [swInt \\* \\_accuStartVertexNumbers](#)
- [swInt \\* \\_firstEdgeVertices](#)
- [swInt \\* \\_vertexNeighbours](#)
- [swInt \\* \\_vertexEdgeNumbers](#)
- [swInt \\* \\_accuVertexEdgeNumbers](#)



## 4.14.1 Constructor & Destructor Documentation

4.14.1.1 `Topology::Topology ()`

4.14.1.2 `Topology::Topology (const Topology & topo)`

4.14.1.3 `Topology::~~Topology ()`

## 4.14.2 Member Function Documentation

4.14.2.1 `void Topology::addEdge ()`

4.14.2.2 `void Topology::addVertex ()`

4.14.2.3 `Topology* Topology::clone () const [inline]`

4.14.2.4 `Topology Topology::constructFromEdge (swInt * startVertices, swInt * endVertices, swInt edgeNumber, bool copy = false) [static]`

4.14.2.5 `Topology Topology::constructFromVertex (swInt * accuVertexEdgeNumbers, swInt * vertexNeighbours, swInt vertexNumber, bool copy = false) [static]`

4.14.2.6 `void Topology::copy (const Topology & topo) [private]`

4.14.2.7 `void Topology::EdgeBasedInit () [private]`

4.14.2.8 `void Topology::edgeBasedToVertexBased ()`

4.14.2.9 `swInt * Topology::getAccuStartVertexNumbers ()`

4.14.2.10 `swInt * Topology::getAccuVertexEdgeNumbers ()`

4.14.2.11 `swInt Topology::getEdgeNumber ()`

4.14.2.12 `swInt * Topology::getEndVertices ()`

4.14.2.13 `swInt * Topology::getFirstEdgeVertices ()`

4.14.2.14 `swInt * Topology::getStartVertexNumbers ()`

4.14.2.15 `swInt * Topology::getStartVertices ()`

4.14.2.16 `swInt * Topology::getVertexEdgeNumbers ()`

4.14.2.17 `swInt * Topology::getVertexNeighbours ()`

4.14.2.18 `swInt Topology::getVertexNumber ()`

4.14.2.19 `Topology & Topology::operator= (const Topology & topo)`

4.14.2.20 `void Topology::removeEdge ()`

4.14.2.21 `void Topology::removeVertex ()`

4.14.2.22 `void Topology::sortAndCompress ()`

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4.14.2.23 `void Topology::transpose ()`

4.14.2.24 `void Topology::VertexBasedInit () [private]`

4.14.2.25 `void Topology::vertexBasedToEdgeBased ()`

- [topology/topology.H](#)
- [topology/topology.C](#)

## 4.15 v2EParameters Struct Reference

```
#include <vertex2EdgeIter_host.h>
```

### Public Attributes

- [MLBParameters](#) \* [MLBParas](#)
- [swFloat](#) \* [data](#)
- [swFloat](#) \* [x](#)
- [swFloat](#) \* [b](#)
- [swFloat](#) \* [diag](#)
- [swInt](#) \* [firstEdgeVertices](#)
- [swInt](#) \* [vertexNeighbor](#)
- [swInt](#) [isXExist](#)
- [swInt](#) [spIndex](#)

### 4.15.1 Member Data Documentation

**4.15.1.1** [swFloat\\*](#) [v2EParameters::b](#)

**4.15.1.2** [swFloat\\*](#) [v2EParameters::data](#)

**4.15.1.3** [swFloat\\*](#) [v2EParameters::diag](#)

**4.15.1.4** [swInt\\*](#) [v2EParameters::firstEdgeVertices](#)

**4.15.1.5** [swInt](#) [v2EParameters::isXExist](#)

**4.15.1.6** [MLBParameters\\*](#) [v2EParameters::MLBParas](#)

**4.15.1.7** [swInt](#) [v2EParameters::spIndex](#)

**4.15.1.8** [swInt\\*](#) [v2EParameters::vertexNeighbor](#)

**4.15.1.9** [swFloat\\*](#) [v2EParameters::x](#)

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

- [iterator/multiLevelBlockIterator/vertex2EdgeIter/vertex2EdgeIter\\_host.h](#)

# Chapter 5

## File Documentation

### 5.1 iterator/iterator.H File Reference

```
#include "iterator_struct.h"  
#include <stdlib.h>  
#include <iostream>  
#include <map>  
#include "swMacro.h"  
#include "topology.H"  
#include "edge2VertexIter_slave.h"
```

#### Classes

- class [Iterator](#)

## 5.2 iterator/iterator\_struct.h File Reference

```
#include "swMacro.h"  
#include <stdlib.h>
```

### Classes

- struct [Arrays](#)
- struct [topoArrays](#)
- struct [MLBFunParameters](#)
- struct [MLBParameters](#)



## 5.3 iterator/multiLevelBlockIterator/BlockOrdering/BlockOrdering.c File Reference

```
#include "BlockOrdering.h"
```

### Defines

- #define **LOG** (printf("%s (%d) - <%s>\n", \_\_FILE\_\_, \_\_LINE\_\_, \_\_FUNCTION\_\_), printf)

### Functions

- void **MLB\_Multilevel\_ordering** (MLB\_graph graph, LABEL levels, LABEL \*blockNums, LABEL \*blockStarts, LABEL \*cellStarts, LABEL \*postCellOrder, LABEL \*postEdgeOrder)
- void **MLB\_ordering** (MLB\_graph graph, LABEL blockNum, LABEL \*postCellOrder, LABEL \*cellStarts)

#### 5.3.1 Define Documentation

- 5.3.1.1 #define **LOG** (printf("%s (%d) - <%s>\n", \_\_FILE\_\_, \_\_LINE\_\_, \_\_FUNCTION\_\_), printf)

#### 5.3.2 Function Documentation

- 5.3.2.1 void **MLB\_Multilevel\_ordering** (MLB\_graph *graph*, LABEL *levels*, LABEL \* *blockNums*, LABEL \* *blockStarts*, LABEL \* *cellStarts*, LABEL \* *postCellOrder*, LABEL \* *postEdgeOrder*)
- 5.3.2.2 void **MLB\_ordering** (MLB\_graph *graph*, LABEL *blockNum*, LABEL \* *postCellOrder*, LABEL \* *cellStarts*)

## 5.4 iterator/multiLevelBlockIterator/BlockOrdering/BlockOrdering.h

### File Reference

```
#include "stdio.h"
#include "metis.h"
#include "extensibleLabelArray.h"
#include "timer.h"
```

### Classes

- struct [struct\\_MLB\\_graph](#)

### Defines

- #define [LABEL](#) int
- #define [SCALAR](#) double
- #define [CERR](#)(...)
- #define [forprt](#)(array, n)
- #define [startTime](#)() LABEL printTime\_start = getSystemTime()
- #define [printTime](#)(tag)

### Typedefs

- typedef struct [struct\\_MLB\\_graph](#) [MLB\\_graph](#)

### Functions

- void [MLB\\_Multilevel\\_ordering](#) ([MLB\\_graph](#) graph, LABEL levels, LABEL \*blockNums, LABEL \*blockStarts, LABEL \*cellStarts, LABEL \*postCellOrder, LABEL \*postEdgeOrder)
- void [MLB\\_ordering](#) ([MLB\\_graph](#) graph, LABEL blockNum, LABEL \*postCellOrder, LABEL \*cellStarts)
- void [MLB\\_postSCALAR](#) (LABEL \*postOrder, SCALAR \*dataArray, LABEL length, LABEL dim)
- void [MLB\\_postLABEL](#) (LABEL \*postOrder, LABEL \*dataArray, LABEL length, LABEL dim)
- void [MLB\\_metis\\_decompose](#) ([idx\\_t](#) cellNum, [idx\\_t](#) edgeNum, [idx\\_t](#) \*adj, [idx\\_t](#) \*neighbor, [idx\\_t](#) \*cellWeight, [idx\\_t](#) \*edgeWeight, [idx\\_t](#) blockNum, [idx\\_t](#) \*options, [idx\\_t](#) \*edgeCut, [idx\\_t](#) \*blockCells, char \*method)
- void [MLB\\_generateCellID](#) (LABEL \*owner, LABEL \*neighbor, LABEL \*cellID, LABEL cellNum, LABEL edgeNum)
- void [MLB\\_offsetEdges](#) (LABEL \*owner, LABEL \*neighbor, LABEL \*cellID, LABEL \*ownerNorm, LABEL \*neighborNorm, LABEL cellNum, LABEL edgeNum)
- void [MLB\\_constructMetisCSR](#) (LABEL \*owner, LABEL \*neighbor, LABEL \*edegWeight, LABEL \*xadj, LABEL \*adjncy, LABEL \*edge\_wgt, LABEL cellNum, LABEL edgeNum)
- LABEL [MLB\\_find](#) (LABEL id, LABEL \*array, LABEL num)
- void [MLB\\_quickSort](#) (int \*arr, int elements)

## 5.4.1 Define Documentation

### 5.4.1.1 #define CERR( ...)

**Value:**

```
{ \
    printf("***Error: at "); \
    printf("%s",__FILE__); \
    printf("+%d:",__LINE__); \
    printf("\n\t"); \
    printf("in function \"%s\": ", __FUNCTION__); \
    printf(__VA_ARGS__); \
}
```

### 5.4.1.2 #define forprt(array, n)

**Value:**

```
{\
    printf(#array);\
    printf("{");\
    LABEL i;\
    for(i=0; i<n; i++)\
        printf(" %d", (LABEL) (array[i]));\
    printf("}\n");\
}
```

### 5.4.1.3 #define LABEL int

### 5.4.1.4 #define printTime(tag)

**Value:**

```
{ \
    printf("=====\n");\
    printf(#tag);\
    printf(": %fs\n", getSystemTime()-printTime_start); \
    printTime_start = getSystemTime(); \
    printf("=====\n");\
}
```

5.4.1.5 **#define** SCALAR double

5.4.1.6 **#define** startTime() LABEL printTime\_start = getSystemTime()

## 5.4.2 Typedef Documentation

5.4.2.1 **typedef struct** struct\_MLB\_graph MLB\_graph

## 5.4.3 Function Documentation

5.4.3.1 **void** MLB\_constructMetisCSR (LABEL \* owner, LABEL \* neighbor, LABEL \* edgeWeight, LABEL \* xadj, LABEL \* adjncy, LABEL \* edge\_wgt, LABEL cellNum, LABEL edgeNum)

5.4.3.2 LABEL MLB\_find (LABEL id, LABEL \* array, LABEL num)

5.4.3.3 **void** MLB\_generateCellID (LABEL \* owner, LABEL \* neighbor, LABEL \* cellID, LABEL cellNum, LABEL edgeNum)

5.4.3.4 **void** MLB\_metis\_decompose (idx\_t cellNum, idx\_t edgeNum, idx\_t \* adj, idx\_t \* neighbor, idx\_t \* cellWeight, idx\_t \* edgeWeight, idx\_t blockNum, idx\_t \* options, idx\_t \* edgeCut, idx\_t \* blockCells, char \* method)

5.4.3.5 **void** MLB\_Multilevel\_ordering (MLB\_graph graph, LABEL levels, LABEL \* blockNums, LABEL \* blockStarts, LABEL \* cellStarts, LABEL \* postCellOrder, LABEL \* postEdgeOrder)

5.4.3.6 **void** MLB\_offsetEdges (LABEL \* owner, LABEL \* neighbor, LABEL \* cellID, LABEL \* ownerNorm, LABEL \* neighborNorm, LABEL cellNum, LABEL edgeNum)

5.4.3.7 **void** MLB\_ordering (MLB\_graph graph, LABEL blockNum, LABEL \* postCellOrder, LABEL \* cellStarts)

5.4.3.8 **void** MLB\_postLABEL (LABEL \* postOrder, LABEL \* dataArray, LABEL length, LABEL dim)

5.4.3.9 **void** MLB\_postSCALAR (LABEL \* postOrder, SCALAR \* dataArray, LABEL length, LABEL dim)

5.4.3.10 **void** MLB\_quickSort (int \* arr, int elements)

## 5.5 iterator/multiLevelBlockIterator/BlockOrdering/BlockOrderingSW.c File Reference

```
#include "BlockOrdering.h"
```

### Defines

- #define **LOG** (printf("%s (%d) - <%s>\n", \_\_FILE\_\_, \_\_LINE\_\_, \_\_FUNCTION\_\_), printf)

### Functions

- void **MLB\_Multilevel\_ordering** (MLB\_graph graph, LABEL levels, LABEL \*blockNums, LABEL \*blockStarts, LABEL \*cellStarts, LABEL \*postCellOrder, LABEL \*postEdgeOrder)
- void **MLB\_ordering** (MLB\_graph graph, LABEL blockNum, LABEL \*postCellOrder, LABEL \*cellStarts)

#### 5.5.1 Define Documentation

- 5.5.1.1** #define **LOG** (printf("%s (%d) - <%s>\n", \_\_FILE\_\_, \_\_LINE\_\_, \_\_FUNCTION\_\_), printf)

#### 5.5.2 Function Documentation

- 5.5.2.1** void **MLB\_Multilevel\_ordering** (MLB\_graph *graph*, LABEL *levels*, LABEL \* *blockNums*, LABEL \* *blockStarts*, LABEL \* *cellStarts*, LABEL \* *postCellOrder*, LABEL \* *postEdgeOrder*)
- 5.5.2.2** void **MLB\_ordering** (MLB\_graph *graph*, LABEL *blockNum*, LABEL \* *postCellOrder*, LABEL \* *cellStarts*)

## 5.6 iterator/multiLevelBlockIterator/BlockOrdering/BOrderUtils.c File Reference

```
#include "BlockOrdering.h"
#include "extensibleLabelArray.h"
```

### Defines

- #define [MAX\\_LEVELS](#) 300

### Functions

- void [MLB\\_postSCALAR](#) (LABEL \*postOrder, SCALAR \*dataArray, LABEL length, LABEL dim)
- void [MLB\\_postLABEL](#) (LABEL \*postOrder, LABEL \*dataArray, LABEL length, LABEL dim)
- void [MLB\\_metis\\_decompose](#) (idx\_t cellNum, idx\_t edgeNum, idx\_t \*xadj, idx\_t \*adjncy, idx\_t \*cellWeight, idx\_t \*edgeWeight, idx\_t blockNum, idx\_t \*options, idx\_t \*edgeCut, idx\_t \*blockCells, char \*method)
- void [MLB\\_generateCellID](#) (LABEL \*owner, LABEL \*neighbor, LABEL \*cellID, LABEL cellNum, LABEL edgeNum)
- void [MLB\\_offsetEdges](#) (LABEL \*owner, LABEL \*neighbor, LABEL \*cellID, LABEL \*ownerNorm, LABEL \*neighborNorm, LABEL cellNum, LABEL edgeNum)
- void [MLB\\_constructMetisCSR](#) (LABEL \*owner, LABEL \*neighbor, LABEL \*edgeWeight, LABEL \*xadj, LABEL \*adjncy, LABEL \*edge\_wgt, LABEL cellNum, LABEL edgeNum)
- LABEL [MLB\\_find](#) (LABEL id, LABEL \*array, LABEL num)
- void [MLB\\_quickSort](#) (int \*arr, int elements)

## 5.6.1 Define Documentation

5.6.1.1 `#define MAX_LEVELS 300`

## 5.6.2 Function Documentation

5.6.2.1 `void MLB_constructMetisCSR (LABEL * owner, LABEL * neighbor, LABEL * edgeWeight, LABEL * xadj, LABEL * adjncy, LABEL * edge_wgt, LABEL cellNum, LABEL edgeNum)`

5.6.2.2 `LABEL MLB_find (LABEL id, LABEL * array, LABEL num)`

5.6.2.3 `void MLB_generateCellID (LABEL * owner, LABEL * neighbor, LABEL * cellID, LABEL cellNum, LABEL edgeNum)`

5.6.2.4 `void MLB_metis_decompose (idx_t cellNum, idx_t edgeNum, idx_t * xadj, idx_t * adjncy, idx_t * cellWeight, idx_t * edgeWeight, idx_t blockNum, idx_t * options, idx_t * edgeCut, idx_t * blockCells, char * method)`

5.6.2.5 `void MLB_offsetEdges (LABEL * owner, LABEL * neighbor, LABEL * cellID, LABEL * ownerNorm, LABEL * neighborNorm, LABEL cellNum, LABEL edgeNum)`

5.6.2.6 `void MLB_postLABEL (LABEL * postOrder, LABEL * dataArray, LABEL length, LABEL dim)`

5.6.2.7 `void MLB_postSCALAR (LABEL * postOrder, SCALAR * dataArray, LABEL length, LABEL dim)`

5.6.2.8 `void MLB_quickSort (int * arr, int elements)`

## 5.7 iterator/multiLevelBlockIterator/BlockOrdering/BOrderUtilsSW.c File Reference

```
#include "BlockOrdering.h"  
#include "extensibleLabelArray.h"
```

### Defines

- #define [MAX\\_LEVELS](#) 300

### Functions

- void [MLB\\_postSCALAR](#) (LABEL \*postOrder, SCALAR \*dataArray, LABEL length, LABEL dim)
- void [MLB\\_postLABEL](#) (LABEL \*postOrder, LABEL \*dataArray, LABEL length, LABEL dim)
- void [MLB\\_metis\\_decompose](#) (idx\_t cellNum, idx\_t edgeNum, idx\_t \*xadj, idx\_t \*adjncy, idx\_t \*cellWeight, idx\_t \*edgeWeight, idx\_t blockNum, idx\_t \*options, idx\_t \*edgeCut, idx\_t \*blockCells, char \*method)
- void [MLB\\_generateCellID](#) (LABEL \*owner, LABEL \*neighbor, LABEL \*cellID, LABEL cellNum, LABEL edgeNum)
- void [MLB\\_offsetEdges](#) (LABEL \*owner, LABEL \*neighbor, LABEL \*cellID, LABEL \*ownerNorm, LABEL \*neighborNorm, LABEL cellNum, LABEL edgeNum)
- void [MLB\\_constructMetisCSR](#) (LABEL \*owner, LABEL \*neighbor, LABEL \*edgeWeight, LABEL \*xadj, LABEL \*adjncy, LABEL \*edge\_wgt, LABEL cellNum, LABEL edgeNum)
- LABEL [MLB\\_find](#) (LABEL id, LABEL \*array, LABEL num)
- void [MLB\\_quickSort](#) (int \*arr, int elements)



## 5.7.1 Define Documentation

5.7.1.1 `#define MAX_LEVELS 300`

## 5.7.2 Function Documentation

5.7.2.1 `void MLB_constructMetisCSR (LABEL * owner, LABEL * neighbor, LABEL * edgeWeight, LABEL * xadj, LABEL * adjncy, LABEL * edge_wgt, LABEL cellNum, LABEL edgeNum)`

5.7.2.2 `LABEL MLB_find (LABEL id, LABEL * array, LABEL num)`

5.7.2.3 `void MLB_generateCellID (LABEL * owner, LABEL * neighbor, LABEL * cellID, LABEL cellNum, LABEL edgeNum)`

5.7.2.4 `void MLB_metis_decompose (idx_t cellNum, idx_t edgeNum, idx_t * xadj, idx_t * adjncy, idx_t * cellWeight, idx_t * edgeWeight, idx_t blockNum, idx_t * options, idx_t * edgeCut, idx_t * blockCells, char * method)`

5.7.2.5 `void MLB_offsetEdges (LABEL * owner, LABEL * neighbor, LABEL * cellID, LABEL * ownerNorm, LABEL * neighborNorm, LABEL cellNum, LABEL edgeNum)`

5.7.2.6 `void MLB_postLABEL (LABEL * postOrder, LABEL * dataArray, LABEL length, LABEL dim)`

5.7.2.7 `void MLB_postSCALAR (LABEL * postOrder, SCALAR * dataArray, LABEL length, LABEL dim)`

5.7.2.8 `void MLB_quickSort (int * arr, int elements)`

## 5.8 iterator/multiLevelBlockIterator/BlockOrdering/extensibleLabelArray.h File Reference

```
#include "stdlib.h"
#include "string.h"
```

### Classes

- struct [struct\\_extensibleLABELArray](#)

### Defines

- #define [LABEL](#) int
- #define [INITSIZE](#) 32

### Typedefs

- typedef struct [struct\\_extensibleLABELArray](#) [ExtensibleLABELArray](#)

### Functions

- void [extensibleLABELArrayInit](#) ([ExtensibleLABELArray](#) \*array)
- void [extensibleLABELArrayAdd](#) ([ExtensibleLABELArray](#) \*array, LABEL value)
- void [extensibleLABELArrayDestroy](#) ([ExtensibleLABELArray](#) \*array)

#### 5.8.1 Define Documentation

5.8.1.1 #define [INITSIZE](#) 32

5.8.1.2 #define [LABEL](#) int

#### 5.8.2 Typedef Documentation

5.8.2.1 typedef struct [struct\\_extensibleLABELArray](#) [ExtensibleLABELArray](#)

#### 5.8.3 Function Documentation

5.8.3.1 void [extensibleLABELArrayAdd](#) ([ExtensibleLABELArray](#) \* *array*, LABEL *value*)

5.8.3.2 void [extensibleLABELArrayDestroy](#) ([ExtensibleLABELArray](#) \* *array*)

5.8.3.3 void [extensibleLABELArrayInit](#) ([ExtensibleLABELArray](#) \* *array*)

## 5.9 iterator/multiLevelBlockIterator/extensibleArray/extensibleLabelArray.h File Reference

```
#include "stdlib.h"
#include "string.h"
```

### Classes

- struct [struct\\_extensibleLABELArray](#)

### Defines

- #define [LABEL](#) int
- #define [INITSIZE](#) 32

### Typedefs

- typedef struct [struct\\_extensibleLABELArray](#) [ExtensibleLABELArray](#)

### Functions

- void [extensibleLABELArrayInit](#) ([ExtensibleLABELArray](#) \*array)
- void [extensibleLABELArrayAdd](#) ([ExtensibleLABELArray](#) \*array, LABEL value)
- void [extensibleLABELArrayDestroy](#) ([ExtensibleLABELArray](#) \*array)

#### 5.9.1 Define Documentation

##### 5.9.1.1 #define INITSIZE 32

##### 5.9.1.2 #define LABEL int

#### 5.9.2 Typedef Documentation

##### 5.9.2.1 typedef struct [struct\\_extensibleLABELArray](#) [ExtensibleLABELArray](#)

#### 5.9.3 Function Documentation

##### 5.9.3.1 void [extensibleLABELArrayAdd](#) ([ExtensibleLABELArray](#) \* array, LABEL value)

##### 5.9.3.2 void [extensibleLABELArrayDestroy](#) ([ExtensibleLABELArray](#) \* array)

##### 5.9.3.3 void [extensibleLABELArrayInit](#) ([ExtensibleLABELArray](#) \* array)

## 5.10 iterator/multiLevelBlockIterator/BlockOrdering/metis.h File Reference

This file contains function prototypes and constant definitions for METIS. `#include <inttypes.h>`

### Defines

- `#define IDXTYPEWIDTH 32`
- `#define REALTYPEWIDTH 64`
- `#define IDX_MAX INT32_MAX`
- `#define IDX_MIN INT32_MIN`
- `#define SCIDX SCNd32`
- `#define PRIDX PRId32`
- `#define strtoidx strtol`
- `#define iabs abs`
- `#define SCREAL "lf"`
- `#define PRREAL "lf"`
- `#define REAL_MAX DBL_MAX`
- `#define REAL_MIN DBL_MIN`
- `#define REAL_EPSILON DBL_EPSILON`
- `#define rabs fabs`
- `#define REALEQ(x, y) ((rabs((x)-(y)) <= DBL_EPSILON))`
- `#define strtoreal strtod`
- `#define METIS_VER_MAJOR 5`
- `#define METIS_VER_MINOR 1`
- `#define METIS_VER_SUBMINOR 0`
- `#define METIS_NOPTIONS 40`
- `#define METIS_API(type) type`

### Typedefs

- `typedef int32_t idx_t`
- `typedef double real_t`

### Enumerations

- `enum rstatus_et { METIS_OK = 1, METIS_ERROR_INPUT = -2, METIS_ERROR_MEMORY = -3, METIS_ERROR = -4 }`
- `enum moptype_et { METIS_OP_PMETIS, METIS_OP_KMETIS, METIS_OP_OMETIS }`
- `enum moptions_et {`  
`METIS_OPTION_PTYPE, METIS_OPTION_OBJTYPE, METIS_OPTION_CTYPE, METIS_`  
`OPTION_IPTYPE,`  
`METIS_OPTION_RTYPE, METIS_OPTION_DBGLVL, METIS_OPTION_NITER, METIS_`  
`OPTION_NCUTS,`  
`METIS_OPTION_SEED, METIS_OPTION_NO2HOP, METIS_OPTION_MINCONN, METIS_`  
`OPTION_CONTIG,`  
`METIS_OPTION_COMPRESS, METIS_OPTION_CCORDER, METIS_OPTION_PFACTOR,`  
`METIS_OPTION_NSEPS,`

```

    METIS_OPTION_UFACTOR,    METIS_OPTION_NUMBERING,    METIS_OPTION_HELP,
    METIS_OPTION_TPWGTS,

    METIS_OPTION_NCOMMON, METIS_OPTION_NOOUTPUT, METIS_OPTION_BALANCE,
    METIS_OPTION_GTYPE,

    METIS_OPTION_UBVEC }
• enum mptype_et { METIS_PTYPE_RB, METIS_PTYPE_KWAY }
• enum mgtype_et { METIS_GTYPE_DUAL, METIS_GTYPE_NODAL }
• enum mctype_et { METIS_CTYPE_RM, METIS_CTYPE_SHEM }
• enum miptype_et {
    METIS_IPTYPE_GROW,    METIS_IPTYPE_RANDOM,    METIS_IPTYPE_EDGE,    METIS_-
    IPTYPE_NODE,

    METIS_IPTYPE_METISRB }
• enum mrtype_et { METIS_RTYPE_FM, METIS_RTYPE_GREEDY, METIS_RTYPE_-
    SEP2SIDED, METIS_RTYPE_SEP1SIDED }
• enum mdbglvl_et {
    METIS_DBG_INFO = 1, METIS_DBG_TIME = 2, METIS_DBG_COARSEN = 4, METIS_DBG_-
    REFINES = 8,

    METIS_DBG_IPART = 16, METIS_DBG_MOVEINFO = 32, METIS_DBG_SEPINFO = 64,
    METIS_DBG_CONNINFO = 128,

    METIS_DBG_CONTIGINFO = 256, METIS_DBG_MEMORY = 2048 }
• enum mobjtype_et { METIS_OBJTYPE_CUT, METIS_OBJTYPE_VOL, METIS_OBJTYPE_-
    NODE }

```

## Functions

- [METIS\\_API](#) (int) METIS\_PartGraphRecursive(idx\_t \*nvtxs

## Variables

- idx\_t \* ncon
- idx\_t idx\_t \* xadj
- idx\_t idx\_t idx\_t \* adjncy
- idx\_t idx\_t idx\_t idx\_t \* vwgt
- idx\_t idx\_t idx\_t idx\_t idx\_t \* vsize
- idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t \* adjwgt
- idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t \* nparts
- idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t real\_t \* tpwgts
- idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t real\_t real\_t \* ubvec
- idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t real\_t real\_t idx\_t \* options
- idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t real\_t real\_t idx\_t idx\_t \* edgecut
- idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t real\_t real\_t idx\_t idx\_t idx\_t \* part
- idx\_t \* nn
- idx\_t idx\_t \* eptr
- idx\_t idx\_t idx\_t \* eind
- idx\_t idx\_t idx\_t idx\_t \* ncommon
- idx\_t idx\_t idx\_t idx\_t idx\_t \* numflag
- idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t \*\* r\_xadj
- idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t \*\* r\_adjncy

- `idx_t idx_t idx_t idx_t idx_t idx_t real_t idx_t idx_t * objval`
- `idx_t idx_t idx_t idx_t idx_t idx_t real_t idx_t idx_t idx_t * epart`
- `idx_t idx_t idx_t idx_t idx_t idx_t real_t idx_t idx_t idx_t idx_t * npart`
- `idx_t idx_t idx_t idx_t idx_t * perm`
- `idx_t idx_t idx_t idx_t idx_t idx_t * iperm`
- `idx_t idx_t idx_t idx_t npes`
- `idx_t idx_t idx_t idx_t idx_t idx_t idx_t idx_t * sizes`
- `idx_t idx_t idx_t idx_t idx_t * sepsize`
- `idx_t idx_t idx_t idx_t * where`
- `idx_t idx_t idx_t idx_t idx_t * hmarker`
- `idx_t idx_t idx_t idx_t idx_t real_t ubfactor`

### 5.10.1 Detailed Description

This file contains function prototypes and constant definitions for METIS.

**Author:**

George

**Date:**

Started 8/9/02

**Version:**

`$Id$`



## 5.10.2 Define Documentation

5.10.2.1 `#define iabs abs`

5.10.2.2 `#define IDX_MAX INT32_MAX`

5.10.2.3 `#define IDX_MIN INT32_MIN`

5.10.2.4 `#define IDXTYPEWIDTH 32`

5.10.2.5 `#define METIS_API(type) type`

5.10.2.6 `#define METIS_NOPTIONS 40`

5.10.2.7 `#define METIS_VER_MAJOR 5`

5.10.2.8 `#define METIS_VER_MINOR 1`

5.10.2.9 `#define METIS_VER_SUBMINOR 0`

5.10.2.10 `#define PRIDX PRId32`

5.10.2.11 `#define PRREAL "lf"`

5.10.2.12 `#define rabs fabs`

5.10.2.13 `#define REAL_EPSILON DBL_EPSILON`

5.10.2.14 `#define REAL_MAX DBL_MAX`

5.10.2.15 `#define REAL_MIN DBL_MIN`

5.10.2.16 `#define REALEQ(x, y) ((rabs((x)-(y)) <= DBL_EPSILON))`

5.10.2.17 `#define REALTYPEWIDTH 64`

5.10.2.18 `#define SCIDX SCNd32`

5.10.2.19 `#define SCREAL "lf"`

5.10.2.20 `#define strtoidx strtol`

5.10.2.21 `#define strtoreal strtod`

## 5.10.3 Typedef Documentation

5.10.3.1 `typedef int32_t idx_t`

5.10.3.2 `typedef double real_t`

## 5.10.4 Enumeration Type Documentation

5.10.4.1 `enum mctype_et`



**Enumerator:***METIS\_CTYPE\_RM**METIS\_CTYPE\_SHEM***5.10.4.2 enum mdbglvl\_et**

Debug Levels

**Enumerator:***METIS\_DBG\_INFO* Shows various diagnostic messages*METIS\_DBG\_TIME* Perform timing analysis*METIS\_DBG\_COARSEN* Show the coarsening progress*METIS\_DBG\_REFINE* Show the refinement progress*METIS\_DBG\_IPART* Show info on initial partitioning*METIS\_DBG\_MOVEINFO* Show info on vertex moves during refinement*METIS\_DBG\_SEPINFO* Show info on vertex moves during sep refinement*METIS\_DBG\_CONNINFO* Show info on minimization of subdomain connectivity*METIS\_DBG\_CONTIGINFO* Show info on elimination of connected components*METIS\_DBG\_MEMORY* Show info related to wspace allocation**5.10.4.3 enum mgtype\_et**

Graph types for meshes

**Enumerator:***METIS\_GTYPE\_DUAL**METIS\_GTYPE\_NODAL***5.10.4.4 enum miptype\_et**

Initial partitioning schemes

**Enumerator:***METIS\_IPTYPE\_GROW**METIS\_IPTYPE\_RANDOM**METIS\_IPTYPE\_EDGE**METIS\_IPTYPE\_NODE**METIS\_IPTYPE\_METISRB*

#### 5.10.4.5 enum mobjtype\_et

Enumerator:

*METIS\_OBJTYPE\_CUT*  
*METIS\_OBJTYPE\_VOL*  
*METIS\_OBJTYPE\_NODE*

#### 5.10.4.6 enum moptions\_et

Options codes (i.e., options[])

Enumerator:

*METIS\_OPTION\_PTYPE*  
*METIS\_OPTION\_OBJTYPE*  
*METIS\_OPTION\_CTYPE*  
*METIS\_OPTION\_IPTYPE*  
*METIS\_OPTION\_RTYPE*  
*METIS\_OPTION\_DBGLVL*  
*METIS\_OPTION\_NITER*  
*METIS\_OPTION\_NCUTS*  
*METIS\_OPTION\_SEED*  
*METIS\_OPTION\_NO2HOP*  
*METIS\_OPTION\_MINCONN*  
*METIS\_OPTION\_CONTIG*  
*METIS\_OPTION\_COMPRESS*  
*METIS\_OPTION\_CCORDER*  
*METIS\_OPTION\_PFACTOR*  
*METIS\_OPTION\_NSEPS*  
*METIS\_OPTION\_UFACTOR*  
*METIS\_OPTION\_NUMBERING*  
*METIS\_OPTION\_HELP*  
*METIS\_OPTION\_TPWGTS*  
*METIS\_OPTION\_NCOMMON*  
*METIS\_OPTION\_NOOUTPUT*  
*METIS\_OPTION\_BALANCE*  
*METIS\_OPTION\_GTYPE*  
*METIS\_OPTION\_UBVEC*

#### 5.10.4.7 enum moptype\_et

Operation type codes

**Enumerator:**

*METIS\_OP\_PMETIS*

*METIS\_OP\_KMETIS*

*METIS\_OP\_OMETIS*

#### 5.10.4.8 enum mptype\_et

Partitioning Schemes

**Enumerator:**

*METIS\_PTYPE\_RB*

*METIS\_PTYPE\_KWAY*

#### 5.10.4.9 enum mrtype\_et

Refinement schemes

**Enumerator:**

*METIS\_RTYPE\_FM*

*METIS\_RTYPE\_GREEDY*

*METIS\_RTYPE\_SEP2SIDED*

*METIS\_RTYPE\_SEP1SIDED*

#### 5.10.4.10 enum rstatus\_et

Return codes

**Enumerator:**

*METIS\_OK* Returned normally

*METIS\_ERROR\_INPUT* Returned due to erroneous inputs and/or options

*METIS\_ERROR\_MEMORY* Returned due to insufficient memory

*METIS\_ERROR* Some other errors



## 5.10.5 Function Documentation

### 5.10.5.1 METIS\_API (int)

## 5.10.6 Variable Documentation

### 5.10.6.1 idx\_t idx\_t idx\_t \* adjncy

### 5.10.6.2 idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t \* adjwgt

### 5.10.6.3 idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t real\_t real\_t idx\_t idx\_t \* edgecut

### 5.10.6.4 idx\_t idx\_t idx\_t \* eind

### 5.10.6.5 idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t real\_t idx\_t idx\_t idx\_t \* epart

### 5.10.6.6 idx\_t idx\_t \* eptr

### 5.10.6.7 idx\_t idx\_t idx\_t idx\_t idx\_t\* hmarker

### 5.10.6.8 idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t \* iperm

### 5.10.6.9 idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t \* ncommon

### 5.10.6.10 idx\_t \* ncon

### 5.10.6.11 idx\_t \* nn

### 5.10.6.12 idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t real\_t idx\_t idx\_t idx\_t idx\_t \* npart

### 5.10.6.13 idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t \* nparts

### 5.10.6.14 idx\_t idx\_t idx\_t idx\_t npes

### 5.10.6.15 idx\_t idx\_t idx\_t idx\_t \* numflag

### 5.10.6.16 idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t real\_t idx\_t idx\_t \* objval

### 5.10.6.17 idx\_t idx\_t idx\_t idx\_t \* options

### 5.10.6.18 idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t \* part

### 5.10.6.19 idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t \* perm

### 5.10.6.20 idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t \*\* r\_adjncy

### 5.10.6.21 idx\_t idx\_t idx\_t idx\_t idx\_t \*\* r\_xadj

### 5.10.6.22 idx\_t idx\_t idx\_t idx\_t idx\_t\* sepsize

### 5.10.6.23 idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t\* sizes

### 5.10.6.24 idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t real\_t \* tpwgts

### 5.10.6.25 idx\_t idx\_t idx\_t idx\_t idx\_t real\_t ubfactor

### 5.10.6.26 idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t idx\_t real\_t real\_t \* ubvec

### 5.10.6.27 idx\_t idx\_t idx\_t idx\_t idx\_t \* vsize

### 5.10.6.28 idx\_t idx\_t \* vwgt

## 5.11 iterator/multiLevelBlockIterator/BlockOrdering/timer.h File Reference

```
#include "sys/time.h"
```

### Functions

- double [getSystemTime](#) ()

#### 5.11.1 Function Documentation

##### 5.11.1.1 double getSystemTime ()

## 5.12 iterator/multiLevelBlockIterator/edge2VertexIter/edge2VertexIter\_host.c File Reference

```
#include "edge2VertexIter_host.h"
#include <athread.h>
#include <stdlib.h>
#include <stdio.h>
#include <sys/time.h>
```

### Functions

- SLAVE\_FUN() [func](#) ()
- void [initOwnNeiSendList](#) ()
- void [edge2VertexIteration\\_init](#) ([Arrays](#) \*edgeData, [Arrays](#) \*vertexData, void(\*[operatorFunPointer\\_host](#))([MLBFunParameters](#) \*MLBFunParas), void(\*[operatorFunPointer\\_slave](#))([MLBFunParameters](#) \*MLBFunParas), [MLBParameters](#) \*MLBParas)
- void [edge2VertexIteration\\_host](#) ([Arrays](#) \*edgeData, [Arrays](#) \*vertexData, void(\*[operatorFunPointer\\_host](#))([MLBFunParameters](#) \*MLBFunParas), void(\*[operatorFunPointer\\_slave](#))([MLBFunParameters](#) \*MLBFunParas), [MLBParameters](#) \*MLBParas)

### Variables

- [swInt](#) spIndex
- [swInt](#) maxXNum
- [swInt](#) maxCell
- [swInt](#) maxEdge
- [swInt](#) cpeBlockNum
- [swInt](#) mshBlockNum
- [swInt](#) \* blockStarts
- [swInt](#) \* cellStarts
- [swInt](#) \* ownNeiSendList
- [swInt](#) \* owner
- [swInt](#) \* neighbor
- [swFloat](#) \* upper
- [swFloat](#) \* lower
- [swFloat](#) \* diag
- [swFloat](#) \* x
- [swFloat](#) \* b
- [int](#) isXExist
- void(\* [operatorFunPointer\\_h](#))([MLBFunParameters](#) \*MLBFunParas)
- void(\* [operatorFunPointer\\_s](#))([MLBFunParameters](#) \*MLBFunParas)





## 5.12.1 Function Documentation

**5.12.1.1** void edge2VertexIteration\_host (Arrays \* *edgeData*, Arrays \* *vertexData*, void(\*) (MLBFunParameters \*MLBFunParas) *operatorFunPointer\_host*, void(\*) (MLBFunParameters \*MLBFunParas) *operatorFunPointer\_slave*, MLBParameters \* *MLBParas*)

**5.12.1.2** void edge2VertexIteration\_init (Arrays \* *edgeData*, Arrays \* *vertexData*, void(\*) (MLBFunParameters \*MLBFunParas) *operatorFunPointer\_host*, void(\*) (MLBFunParameters \*MLBFunParas) *operatorFunPointer\_slave*, MLBParameters \* *MLBParas*)

**5.12.1.3** SLAVE\_FUN() func ()

**5.12.1.4** void initOwnNeiSendList ()

## 5.12.2 Variable Documentation

**5.12.2.1** swFloat \* *b*

**5.12.2.2** swInt\* *blockStarts*

**5.12.2.3** swInt \* *cellStarts*

**5.12.2.4** swInt *cpeBlockNum*

**5.12.2.5** swFloat \* *diag*

**5.12.2.6** int *isXExist*

**5.12.2.7** swFloat \* *lower*

**5.12.2.8** swInt *maxCell*

**5.12.2.9** swInt *maxEdge*

**5.12.2.10** swInt *maxXNum*

**5.12.2.11** swInt *mshBlockNum*

**5.12.2.12** swInt \* *neighbor*

**5.12.2.13** void(\* *operatorFunPointer\_h*)(MLBFunParameters \*MLBFunParas)

**5.12.2.14** void(\* *operatorFunPointer\_s*)(MLBFunParameters \*MLBFunParas)

**5.12.2.15** swInt \* *owner*

**5.12.2.16** swInt\* *ownNeiSendList*

**5.12.2.17** swInt *spIndex*

**5.12.2.18** swFloat\* *upper*

**5.12.2.19** swFloat\* *upper*

---

## 5.13 iterator/multiLevelBlockIterator/edge2VertexIter/edge2VertexIter\_ - host.h File Reference

```
#include <stdlib.h>
#include "swMacro.h"
#include "iterator_struct.h"
#include "edge2VertexIter_slave.h"
```

### Classes

- struct [e2VParas](#)

### Functions

- void [edge2VertexIteration\\_host](#) ([Arrays](#) \*edgeData, [Arrays](#) \*vertexData, void(\*operatorFunPointer\_host)(MLBFunParameters \*MLBFunParas), void(\*operatorFunPointer\_slave)(MLBFunParameters \*MLBFunParas), [MLBParameters](#) \*MLBParas)
- void [edge2VertexIteration\\_init](#) ([Arrays](#) \*edgeData, [Arrays](#) \*vertexData, void(\*operatorFunPointer\_host)(MLBFunParameters \*MLBFunParas), void(\*operatorFunPointer\_slave)(MLBFunParameters \*MLBFunParas), [MLBParameters](#) \*MLBParas)

### 5.13.1 Function Documentation

**5.13.1.1** void [edge2VertexIteration\\_host](#) ([Arrays](#) \* *edgeData*, [Arrays](#) \* *vertexData*, void(\*)([MLBFunParameters](#) \*MLBFunParas) *operatorFunPointer\_host*, void(\*)([MLBFunParameters](#) \*MLBFunParas) *operatorFunPointer\_slave*, [MLBParameters](#) \* *MLBParas*)

**5.13.1.2** void [edge2VertexIteration\\_init](#) ([Arrays](#) \* *edgeData*, [Arrays](#) \* *vertexData*, void(\*)([MLBFunParameters](#) \*MLBFunParas) *operatorFunPointer\_host*, void(\*)([MLBFunParameters](#) \*MLBFunParas) *operatorFunPointer\_slave*, [MLBParameters](#) \* *MLBParas*)

## 5.14 iterator/multiLevelBlockIterator/edge2VertexIter/edge2VertexIter\_slave.c File Reference

```
#include <stdlib.h>
#include <stdio.h>
#include "slave.h"
#include "simd.h"
#include "dma.h"
#include "rlmpi.h"
#include "swMacro.h"
#include "iterator_struct.h"
#include "userFunc_slave.h"
#include "edge2VertexIter_slave.h"
```

### Functions

- void [func](#) ()

### Variables

- `__thread_local volatile int` [myId](#)
- void(\* [operatorFunPointer\\_s](#) )(MLBFunParameters \*MLBFunParas)
- `swInt` [spIndex](#)
- `swInt` [maxXNum](#)
- `swInt` [maxCell](#)
- `swInt` [maxEdge](#)
- `swInt` [cpeBlockNum](#)
- `swInt *` [blockStarts](#)
- `swInt *` [cellStarts](#)
- `swInt *` [ownNeiSendList](#)
- `swInt *` [owner](#)
- `swInt *` [neighbor](#)
- `swFloat *` [upper](#)
- `swFloat *` [lower](#)
- `swFloat *` [diag](#)
- `swFloat *` [x](#)
- `swFloat *` [b](#)
- int [isXExist](#)

### **5.14.1 Function Documentation**

**5.14.1.1 void func ()**

### **5.14.2 Variable Documentation**

**5.14.2.1 swFloat \* b**

**5.14.2.2 swInt\* blockStarts**

**5.14.2.3 swInt \* cellStarts**

**5.14.2.4 swInt cpeBlockNum**

**5.14.2.5 swFloat \* diag**

**5.14.2.6 int isXExist**

**5.14.2.7 swFloat \* lower**

**5.14.2.8 swInt maxCell**

**5.14.2.9 swInt maxEdge**

**5.14.2.10 swInt maxXNum**

**5.14.2.11 \_\_thread\_local volatile int myId**

**5.14.2.12 swInt \* neighbor**

**5.14.2.13 void(\* operatorFunPointer\_s)(MLBFunParameters \*MLBFunParas)**

**5.14.2.14 swInt \* owner**

**5.14.2.15 swInt \* ownNeiSendList**

**5.14.2.16 swInt spIndex**

**5.14.2.17 swFloat\* upper**

**5.14.2.18 swFloat \* x**

## 5.15 iterator/multiLevelBlockIterator/edge2VertexIter/edge2VertexIter\_slave.h File Reference

```
#include <stdlib.h>
#include "iterator_struct.h"
```

## 5.16 iterator/multiLevelBlockIterator/edge2VertexIter/funcPointer.c

### File Reference

```
#include "funcPointer.h"
#include <stdlib.h>
#include <stdio.h>
#include <pthread.h>
#include "userFunc_host.h"
#include "userFuncUnsymm_host.h"
```

### Functions

- SLAVE\_FUN() [spMV](#) ([MLBFunParameters](#) \*MLBFunParas)
- SLAVE\_FUN() [spMVUnsymm](#) ([MLBFunParameters](#) \*MLBFunParas)
- SLAVE\_FUN() [integrate](#) ([MLBFunParameters](#) \*MLBFunParas)
- SLAVE\_FUN() [integrateUnsymm](#) ([MLBFunParameters](#) \*MLBFunParas)
- PF [funcPointer\\_host](#) (swInt flag)
- PF [funcPointer\\_slave](#) (swInt flag)

### 5.16.1 Function Documentation

5.16.1.1 PF [funcPointer\\_host](#) (swInt *flag*)

5.16.1.2 PF [funcPointer\\_slave](#) (swInt *flag*)

5.16.1.3 SLAVE\_FUN() [integrate](#) ([MLBFunParameters](#) \* *MLBFunParas*)

5.16.1.4 SLAVE\_FUN() [integrateUnsymm](#) ([MLBFunParameters](#) \* *MLBFunParas*)

5.16.1.5 SLAVE\_FUN() [spMV](#) ([MLBFunParameters](#) \* *MLBFunParas*)

5.16.1.6 SLAVE\_FUN() [spMVUnsymm](#) ([MLBFunParameters](#) \* *MLBFunParas*)

## 5.17 iterator/multiLevelBlockIterator/edge2VertexIter/funcPointer.h File Reference

```
#include "edge2VertexIter_slave.h"
```

### Typedefs

- typedef void(\* [PF](#))([MLBFunParameters](#) \*MLBFunParas)

### Functions

- [PF funcPointer\\_host](#) ([swInt](#) flag)
- [PF funcPointer\\_slave](#) ([swInt](#) flag)

#### 5.17.1 Typedef Documentation

5.17.1.1 typedef void(\* [PF](#))([MLBFunParameters](#) \*MLBFunParas)

#### 5.17.2 Function Documentation

5.17.2.1 [PF funcPointer\\_host](#) ([swInt](#) *flag*)

5.17.2.2 [PF funcPointer\\_slave](#) ([swInt](#) *flag*)

## 5.18 iterator/multiLevelBlockIterator/edge2VertexIter/userFunc\_-host.c File Reference

```
#include "userFunc_host.h"  
#include <stdlib.h>  
#include "slave.h"
```

### Functions

- void [spMV](#) ([MLBFunParameters](#) \*MLBFunParas)
- void [integrate](#) ([MLBFunParameters](#) \*MLBFunParas)

### 5.18.1 Function Documentation

**5.18.1.1** void [integrate](#) ([MLBFunParameters](#) \* *MLBFunParas*)

**5.18.1.2** void [spMV](#) ([MLBFunParameters](#) \* *MLBFunParas*)



## 5.19 iterator/multiLevelBlockIterator/edge2VertexIter/userFunc\_host.h File Reference

```
#include <stdlib.h>
#include "swMacro.h"
#include "edge2VertexIter_slave.h"
```

### Functions

- void [spMV](#) ([MLBFunParameters](#) \*MLBFunParas)
- void [integrate](#) ([MLBFunParameters](#) \*MLBFunParas)

#### 5.19.1 Function Documentation

**5.19.1.1** void [integrate](#) ([MLBFunParameters](#) \* *MLBFunParas*)

**5.19.1.2** void [spMV](#) ([MLBFunParameters](#) \* *MLBFunParas*)

## 5.20 iterator/multiLevelBlockIterator/edge2VertexIter/userFunc\_slave.c File Reference

```
#include "userFunc_slave.h"  
#include <stdlib.h>  
#include "slave.h"
```

### Functions

- void [spMV](#) ([MLBFunParameters](#) \*MLBFunParas)
- void [integrate](#) ([MLBFunParameters](#) \*MLBFunParas)

### 5.20.1 Function Documentation

**5.20.1.1** void [integrate](#) ([MLBFunParameters](#) \* *MLBFunParas*)

**5.20.1.2** void [spMV](#) ([MLBFunParameters](#) \* *MLBFunParas*)

## 5.21 iterator/multiLevelBlockIterator/edge2VertexIter/userFunc\_slave.h File Reference

```
#include <stdlib.h>
#include "swMacro.h"
#include "edge2VertexIter_slave.h"
```

### Defines

- #define [SLAVE\\_FUNC](#)(funcname) slave\_##funcname

### Functions

- void [spMV](#) ([MLBFunParameters](#) \*MLBFunParas)
- void [integrate](#) ([MLBFunParameters](#) \*MLBFunParas)

#### 5.21.1 Define Documentation

5.21.1.1 #define [SLAVE\\_FUNC](#)(funcname) slave\_##funcname

#### 5.21.2 Function Documentation

5.21.2.1 void [integrate](#) ([MLBFunParameters](#) \* *MLBFunParas*)

5.21.2.2 void [spMV](#) ([MLBFunParameters](#) \* *MLBFunParas*)

## 5.22 iterator/multiLevelBlockIterator/extensibleArray/extensibleLabelArray.c

### File Reference

```
#include "extensibleLabelArray.h"
```

#### Functions

- void [extensibleLABELArrayInit](#) ([ExtensibleLABELArray](#) \*array)
- void [extensibleLABELArrayAdd](#) ([ExtensibleLABELArray](#) \*array, LABEL value)
- void [extensibleLABELArrayDestroy](#) ([ExtensibleLABELArray](#) \*array)

#### 5.22.1 Function Documentation

**5.22.1.1** void [extensibleLABELArrayAdd](#) ([ExtensibleLABELArray](#) \* *array*, LABEL *value*)

**5.22.1.2** void [extensibleLABELArrayDestroy](#) ([ExtensibleLABELArray](#) \* *array*)

**5.22.1.3** void [extensibleLABELArrayInit](#) ([ExtensibleLABELArray](#) \* *array*)

## 5.23 iterator/multiLevelBlockIterator/extensibleArray/extensibleLabelArraySW. File Reference

```
#include "extensibleLabelArray.h"
```

### Functions

- void [extensibleLABELArrayInit](#) ([ExtensibleLABELArray](#) \*array)
- void [extensibleLABELArrayAdd](#) ([ExtensibleLABELArray](#) \*array, LABEL value)
- void [extensibleLABELArrayDestroy](#) ([ExtensibleLABELArray](#) \*array)

### 5.23.1 Function Documentation

**5.23.1.1** void [extensibleLABELArrayAdd](#) ([ExtensibleLABELArray](#) \* *array*, LABEL *value*)

**5.23.1.2** void [extensibleLABELArrayDestroy](#) ([ExtensibleLABELArray](#) \* *array*)

**5.23.1.3** void [extensibleLABELArrayInit](#) ([ExtensibleLABELArray](#) \* *array*)

## 5.24 iterator/multiLevelBlockIterator/extensibleArray/extensibleScalarArray.c File Reference

```
#include "extensibleScalarArray.h"
```

### Functions

- void [extensibleSCALARArrayInit](#) ([ExtensibleSCALARArray](#) \*array)
- void [extensibleSCALARArrayAdd](#) ([ExtensibleSCALARArray](#) \*array, SCALAR value)
- void [extensibleSCALARArrayDestroy](#) ([ExtensibleSCALARArray](#) \*array)

### 5.24.1 Function Documentation

**5.24.1.1** void [extensibleSCALARArrayAdd](#) ([ExtensibleSCALARArray](#) \* *array*, SCALAR *value*)

**5.24.1.2** void [extensibleSCALARArrayDestroy](#) ([ExtensibleSCALARArray](#) \* *array*)

**5.24.1.3** void [extensibleSCALARArrayInit](#) ([ExtensibleSCALARArray](#) \* *array*)

## 5.25 iterator/multiLevelBlockIterator/extensibleArray/extensibleScalarArray.h File Reference

```
#include "stdlib.h"
#include "string.h"
```

### Classes

- struct [struct\\_extensibleSCALARArray](#)

### Defines

- #define [SCALAR](#) double
- #define [LABEL](#) int
- #define [INITSIZE](#) 32

### Typedefs

- typedef struct [struct\\_extensibleSCALARArray](#) [ExtensibleSCALARArray](#)

### Functions

- void [extensibleSCALARArrayInit](#) ([ExtensibleSCALARArray](#) \*array)
- void [extensibleSCALARArrayAdd](#) ([ExtensibleSCALARArray](#) \*array, [SCALAR](#) value)
- void [extensibleSCALARArrayDestroy](#) ([ExtensibleSCALARArray](#) \*array)

#### 5.25.1 Define Documentation

5.25.1.1 #define [INITSIZE](#) 32

5.25.1.2 #define [LABEL](#) int

5.25.1.3 #define [SCALAR](#) double

#### 5.25.2 Typedef Documentation

5.25.2.1 typedef struct [struct\\_extensibleSCALARArray](#) [ExtensibleSCALARArray](#)

#### 5.25.3 Function Documentation

5.25.3.1 void [extensibleSCALARArrayAdd](#) ([ExtensibleSCALARArray](#) \* *array*, [SCALAR](#) *value*)

5.25.3.2 void [extensibleSCALARArrayDestroy](#) ([ExtensibleSCALARArray](#) \* *array*)

5.25.3.3 void [extensibleSCALARArrayInit](#) ([ExtensibleSCALARArray](#) \* *array*)

## 5.26 iterator/multiLevelBlockIterator/extensibleArray/extensibleScalarArraySW File Reference

```
#include "extensibleScalarArray.h"
```

### Functions

- void [extensibleSCALARArrayInit](#) ([ExtensibleSCALARArray](#) \*array)
- void [extensibleSCALARArrayAdd](#) ([ExtensibleSCALARArray](#) \*array, SCALAR value)
- void [extensibleSCALARArrayDestroy](#) ([ExtensibleSCALARArray](#) \*array)

### 5.26.1 Function Documentation

**5.26.1.1** void [extensibleSCALARArrayAdd](#) ([ExtensibleSCALARArray](#) \* *array*, SCALAR *value*)

**5.26.1.2** void [extensibleSCALARArrayDestroy](#) ([ExtensibleSCALARArray](#) \* *array*)

**5.26.1.3** void [extensibleSCALARArrayInit](#) ([ExtensibleSCALARArray](#) \* *array*)



## 5.27 iterator/multiLevelBlockIterator/multiLevelBlockIterator.C File Reference

```
#include "multiLevelBlockIterator.H"  
#include <stdlib.h>  
#include <iostream>  
#include <assert.h>  
#include "BlockOrdering/BlockOrdering.h"  
#include "edge2VertexIter_host.h"  
#include "vertex2EdgeIter_host.h"
```

### Defines

- #define [MAX](#)(A, B) A > B ? A : B

#### 5.27.1 Define Documentation

##### 5.27.1.1 #define MAX(A, B) A > B ? A : B

## 5.28 iterator/multiLevelBlockIterator/multiLevelBlockIterator.H

### File Reference

```
#include <iostream>
#include "swMacro.h"
#include "iterator.H"
#include "topology.H"
#include "multiLevelBlockIterator.C"
```

### Classes

- class [MultiLevelBlockIterator](#)

## 5.29 iterator/multiLevelBlockIterator/vertex2EdgeIter/userFuncUnsymm\_host.c File Reference

```
#include "userFuncUnsymm_host.h"
#include <stdlib.h>
#include "slave.h"
```

### Functions

- void [spMVUnsymm](#) ([MLBFunParameters](#) \*MLBFunParas)
- void [integrateUnsymm](#) ([MLBFunParameters](#) \*MLBFunParas)

#### 5.29.1 Function Documentation

**5.29.1.1** void [integrateUnsymm](#) ([MLBFunParameters](#) \* *MLBFunParas*)

**5.29.1.2** void [spMVUnsymm](#) ([MLBFunParameters](#) \* *MLBFunParas*)

## 5.30 iterator/multiLevelBlockIterator/vertex2EdgeIter/userFuncUnsymm\_-host.h File Reference

```
#include <stdlib.h>
#include "swMacro.h"
#include "iterator_struct.h"
```

### Functions

- void [spMVUnsymm](#) ([MLBFunParameters](#) \*MLBFunParas)
- void [integrateUnsymm](#) ([MLBFunParameters](#) \*MLBFunParas)

### 5.30.1 Function Documentation

**5.30.1.1** void [integrateUnsymm](#) ([MLBFunParameters](#) \* *MLBFunParas*)

**5.30.1.2** void [spMVUnsymm](#) ([MLBFunParameters](#) \* *MLBFunParas*)

## 5.31 iterator/multiLevelBlockIterator/vertex2EdgeIter/userFuncUnsymm\_slave.c File Reference

```
#include "userFuncUnsymm_slave.h"  
#include <stdlib.h>  
#include "slave.h"
```

### Functions

- void [spMVUnsymm](#) ([MLBFunParameters](#) \*MLBFunParas)
- void [integrateUnsymm](#) ([MLBFunParameters](#) \*MLBFunParas)

#### 5.31.1 Function Documentation

5.31.1.1 void [integrateUnsymm](#) ([MLBFunParameters](#) \* *MLBFunParas*)

5.31.1.2 void [spMVUnsymm](#) ([MLBFunParameters](#) \* *MLBFunParas*)

## 5.32 iterator/multiLevelBlockIterator/vertex2EdgeIter/userFuncUnsymm\_slave.h File Reference

```
#include <stdlib.h>
#include "swMacro.h"
#include "iterator_struct.h"
```

### Defines

- #define [SLAVE\\_FUNC](#)(funcname) slave\_##funcname

### Functions

- void [spMVUnsymm](#) ([MLBFunParameters](#) \*MLBFunParas)
- void [integrateUnsymm](#) ([MLBFunParameters](#) \*MLBFunParas)

#### 5.32.1 Define Documentation

5.32.1.1 #define [SLAVE\\_FUNC](#)(funcname) slave\_##funcname

#### 5.32.2 Function Documentation

5.32.2.1 void [integrateUnsymm](#) ([MLBFunParameters](#) \* *MLBFunParas*)

5.32.2.2 void [spMVUnsymm](#) ([MLBFunParameters](#) \* *MLBFunParas*)

## 5.33 iterator/multiLevelBlockIterator/vertex2EdgeIter/vertex2EdgeIter\_host.c File Reference

```
#include "vertex2EdgeIter_host.h"
#include <sys/time.h>
#include <pthread.h>
#include <stdio.h>
```

### Functions

- SLAVE\_FUN() [vertex2EdgeIter\\_slave](#) ([v2EParameters](#) \*v2EParas)
- void [initOwnNeiSendListV2E](#) ([v2EParameters](#) \*v2EParas, [swInt](#) \*ownNeiSendList)
- void [vertex2EdgeIteration\\_host](#) ([Arrays](#) \*neighbourData, [Arrays](#) \*vertexData, [MLBParameters](#) \*MLBParas)

#### 5.33.1 Function Documentation

**5.33.1.1** void [initOwnNeiSendListV2E](#) ([v2EParameters](#) \* *v2EParas*, [swInt](#) \* *ownNeiSendList*)

**5.33.1.2** SLAVE\_FUN() [vertex2EdgeIter\\_slave](#) ([v2EParameters](#) \* *v2EParas*)

**5.33.1.3** void [vertex2EdgeIteration\\_host](#) ([Arrays](#) \* *neighbourData*, [Arrays](#) \* *vertexData*, [MLBParameters](#) \* *MLBParas*)

## 5.34 iterator/multiLevelBlockIterator/vertex2EdgeIter/vertex2EdgeIter\_ - host.h File Reference

```
#include <stdlib.h>
#include "swMacro.h"
#include "iterator_struct.h"
#include "edge2VertexIter_slave.h"
```

### Classes

- struct [v2EParameters](#)

### Functions

- void [vertex2EdgeIteration\\_host](#) ([Arrays](#) \*neighbourData, [Arrays](#) \*vertexData, [MLBParameters](#) \*MLBParas)

#### 5.34.1 Function Documentation

- 5.34.1.1** void [vertex2EdgeIteration\\_host](#) ([Arrays](#) \* *neighbourData*, [Arrays](#) \* *vertexData*, [MLBParameters](#) \* *MLBParas*)



## 5.35 iterator/multiLevelBlockIterator/vertex2EdgeIter/vertex2EdgeIter\_slave.c File Reference

```
#include <stdlib.h>
#include <stdio.h>
#include <assert.h>
#include "slave.h"
#include "dma.h"
#include "rlmpi.h"
#include "swMacro.h"
#include "iterator_struct.h"
#include "userFunc_slave.h"
#include "vertex2EdgeIter_host.h"
```

### Functions

- void [vertex2EdgeIter\\_slave](#) ([v2EParameters](#) \*[v2EParas](#))

### Variables

- `__thread_local volatile int` [myId](#)

#### 5.35.1 Function Documentation

**5.35.1.1** void [vertex2EdgeIter\\_slave](#) ([v2EParameters](#) \* [v2EParas](#))

#### 5.35.2 Variable Documentation

**5.35.2.1** `__thread_local volatile int` [myId](#)

## 5.36 RL\_MPI/main.cxx File Reference

```
#include "RlmpiInitializer.hxx"  
#include "iostream"  
#include <vector>
```

### Functions

- int [main](#) ()

### 5.36.1 Function Documentation

#### 5.36.1.1 int main ()

## 5.37 RL\_MPI/register.C File Reference

```
#include "register.H"  
#include <iostream>  
#include <vector>  
#include <math.h>  
#include <assert.h>  
#include "swMacro.h"  
#include "athread.h"  
#include <algorithm>
```

### Functions

- void [slave\\_initTable](#) ([Schedule](#) \*data)
- void [initSendList](#) (int \*dataSendList, int [mshBlockNum](#))
- void [initTable](#) (int index)
- void [destroyTable](#) (int index)

### 5.37.1 Function Documentation

**5.37.1.1** void [destroyTable](#) (int *index*)

**5.37.1.2** void [initSendList](#) (int \* *dataSendList*, int *mshBlockNum*)

**5.37.1.3** void [initTable](#) (int *index*)

**5.37.1.4** void [slave\\_initTable](#) ([Schedule](#) \* *data*)

## 5.38 RL\_MPI/register.H File Reference

```
#include "RlmpiInitializer.hxx"
```

### Functions

- void [initSendList](#) (int \*dataSendList, int [mshBlockNum](#))
- void [initTable](#) (int index)
- void [destroyTable](#) (int index)

### Variables

- [Schedule](#) \* [schedule\\_data](#)

### 5.38.1 Function Documentation

**5.38.1.1** void [destroyTable](#) (int *index*)

**5.38.1.2** void [initSendList](#) (int \* *dataSendList*, int *mshBlockNum*)

**5.38.1.3** void [initTable](#) (int *index*)

### 5.38.2 Variable Documentation

**5.38.2.1** [Schedule](#)\* [schedule\\_data](#)

## 5.39 RL\_MPI/rmpi.c File Reference

```
#include <slave.h>
#include <dma.h>
#include <unistd.h>
#include <simd.h>
#include "RlmpiSharedType.h"
#include "rlmpi.h"
```

### Functions

- `__thread_local` `fix` `volatile` `__attribute__((aligned(32)))`
- `int` `largerest` (`int` `a`, `int` `b`, `int` `c`)
- `void` `sunway_check_memory_left` (`int` `*data`)
- `void` `load_reg_mpi_init_data` (`Schedule` `*reg_data`)
- `void` `initTable` (`Schedule` `*reg_data`)
- `void` `TransformPackage3` (`const` `Pack` `*sPacks_`, `Pack` `*rPacks_`)
- `void` `TransformSameRowPackage` (`const` `Pack` `*sPacks`, `Pack` `*rPacks`)
- `void` `TransformSameColumnPackage` (`const` `Pack` `*sPacks`, `Pack` `*rPacks`)
- `void` `sort_recv_package` (`Pack` `*rPacks_`, `int` `npack`)
- `void` `transform_data` ()

### Variables

- `__thread_local` `fix` `Pack` `_sPacks` [`MaxNPackages`]
- `__thread_local` `fix` `Pack` `_rPacks` [`MaxNPackages`]
- `__thread_local` `fix` `Pack` `*_sPacks_same_col`
- `__thread_local` `fix` `Pack` `*_sPacks_same_row`

### 5.39.1 Function Documentation

5.39.1.1 `__thread_local_fix volatile __attribute__((aligned(32)))`

5.39.1.2 `void initTable (Schedule * reg_data)`

5.39.1.3 `int largerest (int a, int b, int c)` `[inline]`

5.39.1.4 `void load_reg_mpi_init_data (Schedule * reg_data)` `[inline]`

5.39.1.5 `void sort_recv_package (Pack * rPacks_, int npack)` `[inline]`

5.39.1.6 `void sunway_check_memory_left (int * data)`

5.39.1.7 `void transform_data ()` `[inline]`

5.39.1.8 `void TransformPackage3 (const Pack * sPacks_, Pack * rPacks_)` `[inline]`

5.39.1.9 `void TransformSameColumnPackage (const Pack * sPacks, Pack * rPacks)` `[inline]`

5.39.1.10 `void TransformSameRowPackage (const Pack * sPacks, Pack * rPacks)` `[inline]`

### 5.39.2 Variable Documentation

5.39.2.1 `__thread_local_fix Pack _rPacks[MaxNPackages]`

5.39.2.2 `__thread_local_fix Pack _sPacks[MaxNPackages]`

5.39.2.3 `__thread_local_fix Pack* _sPacks_same_col`

5.39.2.4 `__thread_local_fix Pack* _sPacks_same_row`

## 5.40 RL\_MPI/rmpi.h File Reference

```
#include <slave.h>
#include "RlmpiSharedType.h"
```

### Defines

- #define [MaxNPackages](#) 450
- #define [MaxNCycle](#) 200
- #define [MaxNElm](#) 35
- #define [COL\(x\)](#) (x & 0x07)
- #define [ROW\(x\)](#) ((x & 0x38) >> 3)
- #define [REG\\_PUTR](#)(var, dst) asm volatile ("putr %0,%1\n":"r"(var),"r"(dst):"memory")
- #define [REG\\_PUTC](#)(var, dst) asm volatile ("putc %0,%1\n":"r"(var),"r"(dst):"memory")
- #define [REG\\_GETR](#)(var) asm volatile ("getr %0\n":"=r"(var):"memory")
- #define [REG\\_GETC](#)(var) asm volatile ("getc %0\n":"=r"(var):"memory")
- #define [REG\\_SIMD\\_PUTR](#)(var, dst) asm volatile ("putr %0,%1\n":"r"(var),"r"(dst):"memory")
- #define [REG\\_SIMD\\_PUTC](#)(var, dst) asm volatile ("putc %0,%1\n":"r"(var),"r"(dst):"memory")
- #define [REG\\_SIMD\\_GETR](#)(var) asm volatile ("getr %0\n":"=r"(var):"memory")
- #define [REG\\_SIMD\\_GETC](#)(var) asm volatile ("getc %0\n":"=r"(var):"memory")
- #define [ROWSYN](#) pthread\_syn(ROW\_SCOPE,0xff)
- #define [COLSYN](#) pthread\_syn(COL\_SCOPE,0xff)
- #define [ALLSYN](#) pthread\_syn(ARRAY\_SCOPE,0xffff)

### Functions

- [\\_\\_thread\\_local\\_fix](#) volatile [\\_\\_attribute\\_\\_](#) ((aligned(32))) [int8LDM](#) \_putr\_schedules[MaxNCycle]
- void [TransformPackage3](#) (const Pack \*sPacks, Pack \*rPacks)
- void [TransformSameColumnPackage](#) (const Pack \*sPacks, Pack \*rPacks)
- void [TransformSameRowPackage](#) (const Pack \*sPacks, Pack \*rPacks)
- void [load\\_reg\\_mpi\\_init\\_data](#) (Schedule \*reg\_data)
- void [REG\\_SIMD\\_GETR\\_PUTC](#) ()

### Variables

- [\\_\\_thread\\_local\\_fix](#) Pack [\\_sPacks](#) [MaxNPackages]
- [\\_\\_thread\\_local\\_fix](#) Pack [\\_rPacks](#) [MaxNPackages]
- [\\_\\_thread\\_local\\_fix](#) Pack \* [\\_sPacks\\_same\\_col](#)
- [\\_\\_thread\\_local\\_fix](#) Pack \* [\\_sPacks\\_same\\_row](#)
- [\\_\\_thread\\_local\\_fix](#) volatile Table [\\_table\\_ldm](#)
- [\\_\\_thread\\_local\\_fix](#) int [\\_total\\_send\\_pcg](#)
- [\\_\\_thread\\_local\\_fix](#) int [\\_total\\_recv\\_pcg](#)
- [\\_\\_thread\\_local\\_fix](#) int [\\_nCycle](#)
- [\\_\\_thread\\_local\\_fix](#) int [\\_nCycleSameCol](#)
- [\\_\\_thread\\_local\\_fix](#) volatile int [\\_nCycleSameRow](#)
- [\\_\\_thread\\_local](#) int [\\_get\\_reply](#)
- [\\_\\_thread\\_local](#) int [\\_put\\_reply](#)





## 5.40.1 Define Documentation

- 5.40.1.1 `#define ALLSYN athread_syn(ARRAY_SCOPE,0xffff)`
- 5.40.1.2 `#define COL(x) (x & 0x07)`
- 5.40.1.3 `#define COLSYN athread_syn(COL_SCOPE,0xff)`
- 5.40.1.4 `#define MaxNCycle 200`
- 5.40.1.5 `#define MaxNElm 35`
- 5.40.1.6 `#define MaxNPackages 450`
- 5.40.1.7 `#define REG_GETC(var) asm volatile ("getc %0\n":"=r"(var)::"memory")`
- 5.40.1.8 `#define REG_GETR(var) asm volatile ("getr %0\n":"=r"(var)::"memory")`
- 5.40.1.9 `#define REG_PUTC(var, dst) asm volatile ("putc %0,%1\n":"=r"(var),"r"(dst)::"memory")`
- 5.40.1.10 `#define REG_PUTR(var, dst) asm volatile ("putr %0,%1\n":"=r"(var),"r"(dst)::"memory")`
- 5.40.1.11 `#define REG_SIMD_GETC(var) asm volatile ("getc %0\n":"=r"(var)::"memory")`
- 5.40.1.12 `#define REG_SIMD_GETR(var) asm volatile ("getr %0\n":"=r"(var)::"memory")`
- 5.40.1.13 `#define REG_SIMD_PUTC(var, dst) asm volatile ("putc %0,%1\n":"=r"(var),"r"(dst)::"memory")`
- 5.40.1.14 `#define REG_SIMD_PUTR(var, dst) asm volatile ("putr %0,%1\n":"=r"(var),"r"(dst)::"memory")`
- 5.40.1.15 `#define ROW(x) ((x & 0x38) >> 3)`
- 5.40.1.16 `#define ROWSYN athread_syn(ROW_SCOPE,0xff)`

## 5.40.2 Function Documentation

- 5.40.2.1 `__thread_local_fix volatile __attribute__((aligned(32)))`
- 5.40.2.2 `void load_reg_mpi_init_data (Schedule * reg_data) [inline]`
- 5.40.2.3 `void REG_SIMD_GETR_PUTC () [inline]`
- 5.40.2.4 `void TransformPackage3 (const Pack * sPacks, Pack * rPacks) [inline]`
- 5.40.2.5 `void TransformSameColumnPackage (const Pack * sPacks, Pack * rPacks) [inline]`
- 5.40.2.6 `void TransformSameRowPackage (const Pack * sPacks, Pack * rPacks) [inline]`

## 5.40.3 Variable Documentation

---

5.40.3.1 `__thread_local_fix int _nCycle`

5.40.3.2 `__thread_local_fix int _nCycleSameCol`

5.40.3.3 `__thread_local_fix volatile int _nCycleSameRow`

## 5.41 RL\_MPI/RlmpiInitializer.cxx File Reference

```
#include "RlmpiInitializer.hxx"
#include <vector>
#include <map>
#include <iostream>
#include <cstdlib>
#include <algorithm>
#include <utility>
#include <string>
#include <fstream>
#include <sstream>
```

### Functions

- void [generate\\_register\\_transform\\_table](#) (int(\*dst\_list)[64], int(\*sendN)[64], Table \*table)
- void [generate\\_register\\_transform\\_table\\_same\\_row](#) (const int(\*dst\_list)[64], const int(\*sendN)[64], Table \*table)
- void [generate\\_register\\_transform\\_table\\_same\\_col](#) (int(\*dst\_list)[64], int(\*sendN)[64], Table \*table)
- template<typename T >  
std::string [NumberToString](#) (T Number)

### 5.41.1 Function Documentation

**5.41.1.1** void [generate\\_register\\_transform\\_table](#) (int(\*) *dst\_list*[64], int(\*) *sendN*[64], Table \* *table*)

**5.41.1.2** void [generate\\_register\\_transform\\_table\\_same\\_col](#) (int(\*) *dst\_list*[64], int(\*) *sendN*[64], Table \* *table*)

for test////

**5.41.1.3** void [generate\\_register\\_transform\\_table\\_same\\_row](#) (const int(\*) *dst\_list*[64], const int(\*) *sendN*[64], Table \* *table*)

for test////

**5.41.1.4** template<typename T > std::string [NumberToString](#) (T *Number*) [inline]

## 5.42 RL\_MPI/RlmpiInitializer.hxx File Reference

```
#include <vector>
#include <map>
#include <time.h>
#include "RlmpiSharedType.h"
```

### Classes

- class [RlmpiInitializer](#)

### Defines

- #define [COL\(x\)](#) (x & 0x07)
- #define [ROW\(x\)](#) ((x & 0x38) >> 3)
- #define [DISP\(x\)](#) std::cout << \_\_FILE\_\_<<" "<<\_\_LINE\_\_<< ", " << #x ": " << (x) << std::endl
- #define [DISP2\(x, y\)](#) std::cout << \_\_FILE\_\_<<" "<<\_\_LINE\_\_<< ", " << #x ": " << x << " "<<y<< std::endl

### Functions

- static double [timestamp](#) ()

#### 5.42.1 Define Documentation

##### 5.42.1.1 #define COL(x) (x & 0x07)

##### 5.42.1.2 #define DISP(x) std::cout << \_\_FILE\_\_<<" "<<\_\_LINE\_\_<< ", " << #x ": " << (x) << std::endl

##### 5.42.1.3 #define DISP2(x, y) std::cout << \_\_FILE\_\_<<" "<<\_\_LINE\_\_<< ", " << #x ": " << x << " "<<y<< std::endl

##### 5.42.1.4 #define ROW(x) ((x & 0x38) >> 3)

#### 5.42.2 Function Documentation

##### 5.42.2.1 static double timestamp () [inline, static]

## 5.43 RL\_MPI/RlmpiSharedType.h File Reference

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

### Classes

- struct [\\_\\_attribute\\_\\_](#)
- struct [\\_\\_attribute\\_\\_](#)
- struct [Schedule](#)

### Defines

- #define [USE\\_DYNAMIC\\_MEM\\_INDICE](#) 1
- #define [USE\\_DYNAMIC\\_MEM](#) 1
- #define [MaxNPackages](#) 450
- #define [MaxNCycle](#) 200
- #define [MaxNElm](#) 35
- #define [FatalError](#)(s)
- #define [thread\\_mask](#) 10000
- #define [mpi\\_mask](#) 20000

### Typedefs

- typedef int [ThreadID](#)
- typedef unsigned char [int8LDM](#)
- typedef float [sReal](#)
- typedef double [dReal](#)
- typedef short [int16LDM](#)

#### 5.43.1 Define Documentation

##### 5.43.1.1 #define FatalError(s)

**Value:**

```
{  
    printf("Fatal error '%s' at %s:%d\n", s, __FILE__, __LINE__);  
    abort(); }  
}
```

5.43.1.2 `#define MaxNCycle 200`

5.43.1.3 `#define MaxNElm 35`

5.43.1.4 `#define MaxNPackages 450`

5.43.1.5 `#define mpi_mask 20000`

5.43.1.6 `#define thread_mask 10000`

5.43.1.7 `#define USE_DYNAMIC_MEM 1`

5.43.1.8 `#define USE_DYNAMIC_MEM_INDICE 1`

## 5.43.2 Typedef Documentation

5.43.2.1 `typedef double dReal`

5.43.2.2 `typedef short int16LDM`

5.43.2.3 `typedef unsigned char int8LDM`

5.43.2.4 `typedef float sReal`

5.43.2.5 `typedef int ThreadID`

## 5.44 RL\_MPI/test.c File Reference

```
#include <slave.h>
#include <dma.h>
#include <unistd.h>
#include <simd.h>
#include "rlmpi.h"
```

### Functions

- void [test](#) ([Schedule](#) \*data)
- void [test\\_athread\\_get](#) (double \*in)

#### 5.44.1 Function Documentation

**5.44.1.1** void [test](#) ([Schedule](#) \* *data*)

**5.44.1.2** void [test\\_athread\\_get](#) (double \* *in*)

## 5.45 test/multiLevelBlock/test.cpp File Reference

```
#include <iostream>
#include <stdio.h>
#include <sys/time.h>
#include "swMacro.h"
#include "topology.H"
#include "iterator.H"
#include "multiLevelBlockIterator.H"
#include "iterator_struct.h"
#include "funcPointer.h"
```

### Defines

- #define [NONZERONUM](#) 1516800

### Functions

- int \* [readFile](#) (char \*name)
- void [debug](#) ([Topology](#) t)
- void [checkResult](#) ([swFloat](#) \*array1, [swFloat](#) \*array2, [swInt](#) count)
- int [main](#) ()

### Variables

- void(\* [operatorFunPointer\\_host](#) )([MLBFunParameters](#) \*MLBFunParas)
- void(\* [operatorFunPointer\\_slave](#) )([MLBFunParameters](#) \*MLBFunParas)

### 5.45.1 Define Documentation

5.45.1.1 `#define NONZERONUM 1516800`

### 5.45.2 Function Documentation

5.45.2.1 `void checkResult (swFloat * array1, swFloat * array2, swInt count)`

5.45.2.2 `void debug (Topology t)`

5.45.2.3 `int main ()`

5.45.2.4 `int * readFile (char * name)`

### 5.45.3 Variable Documentation

5.45.3.1 `void(* operatorFunPointer_host)(MLBFunParameters *MLBFunParas)`

5.45.3.2 `void(* operatorFunPointer_slave)(MLBFunParameters *MLBFunParas)`



## 5.46 tools/slaveUtils.c File Reference

```
#include "slaveUtils.h"
```

### Functions

- void [DMA\\_Get](#) (void \*dest, const void \*source, const int size)
- void [DMA\\_IGet](#) (void \*dest, const void \*source, const int size, [DMA\\_Status](#) \*status)
- void [DMA\\_Put](#) (void \*dest, const void \*source, const int size)
- void [DMA\\_IPut](#) (void \*dest, const void \*source, const int size, [DMA\\_Status](#) \*status)
- void [DMA\\_Wait](#) ([DMA\\_Status](#) \*status, const int num)
- void [athread\\_wait](#) (int \*reply, int count)

### 5.46.1 Function Documentation

**5.46.1.1** void [athread\\_wait](#) (int \* *reply*, int *count*)

**5.46.1.2** void [DMA\\_Get](#) (void \* *dest*, const void \* *source*, const int *size*)

**5.46.1.3** void [DMA\\_IGet](#) (void \* *dest*, const void \* *source*, const int *size*, [DMA\\_Status](#) \* *status*)

**5.46.1.4** void [DMA\\_IPut](#) (void \* *dest*, const void \* *source*, const int *size*, [DMA\\_Status](#) \* *status*)

**5.46.1.5** void [DMA\\_Put](#) (void \* *dest*, const void \* *source*, const int *size*)

**5.46.1.6** void [DMA\\_Wait](#) ([DMA\\_Status](#) \* *status*, const int *num*)

## 5.47 tools/slaveUtils.h File Reference

```
#include <slave.h>
#include <dma.h>
```

### Defines

- #define [ALIGNED](#)(addr) (((((unsigned long)(addr-1)>>5)+1)<<5)
- #define [A\\_DMA\\_GET\\_SET](#)(da, mode, len, re\_addr)
- #define [A\\_DMA\\_GET\\_RUN](#)(da, src, dest)
- #define [A\\_DMA\\_PUT\\_SET](#)(da, mode, len, re\_addr)
- #define [A\\_DMA\\_PUT\\_RUN](#)(da, src, dest)

### Typedefs

- typedef unsigned long [DMA\\_Status](#)

### Functions

- void [DMA\\_Get](#) (void \*dest, const void \*source, const int size)
- void [DMA\\_IGet](#) (void \*dest, const void \*source, const int size, [DMA\\_Status](#) \*status)
- void [DMA\\_Put](#) (void \*dest, const void \*source, const int size)
- void [DMA\\_IPut](#) (void \*dest, const void \*source, const int size, [DMA\\_Status](#) \*status)
- void [DMA\\_Wait](#) ([DMA\\_Status](#) \*status, const int num)
- void [athread\\_wait](#) (int \*reply, int count)

### 5.47.1 Define Documentation

#### 5.47.1.1 #define A\_DMA\_GET\_RUN(da, src, dest)

##### Value:

```
{ \
    dma(da,src,dest); \
}
```

#### 5.47.1.2 #define A\_DMA\_GET\_SET(da, mode, len, re\_addr)

##### Value:

```
{ \
    dma_set_op(&da,DMA_GET); \
    dma_set_mode(&da,mode); \
    dma_set_size(&da,len); \
    dma_set_reply(&da,re_addr); \
}
```

### 5.47.1.3 #define A\_DMA\_PUT\_RUN(da, src, dest)

**Value:**

```
{ \
    dma(da, dest, src); \
}
```

### 5.47.1.4 #define A\_DMA\_PUT\_SET(da, mode, len, re\_addr)

**Value:**

```
{ \
    dma_set_op(&da, DMA_PUT); \
    dma_set_mode(&da, mode); \
    dma_set_size(&da, len); \
    dma_set_reply(&da, re_addr); \
}
```

### 5.47.1.5 #define ALIGNED(addr) (((unsigned long)(addr-1)>>5)+1)<<5)

## 5.47.2 Typedef Documentation

### 5.47.2.1 typedef unsigned long DMA\_Status

## 5.47.3 Function Documentation

### 5.47.3.1 void athread\_wait (int \*reply, int count)

### 5.47.3.2 void DMA\_Get (void \*dest, const void \*source, const int size)

### 5.47.3.3 void DMA\_IGet (void \*dest, const void \*source, const int size, DMA\_Status \*status)

### 5.47.3.4 void DMA\_IPut (void \*dest, const void \*source, const int size, DMA\_Status \*status)

### 5.47.3.5 void DMA\_Put (void \*dest, const void \*source, const int size)

### 5.47.3.6 void DMA\_Wait (DMA\_Status \*status, const int num)

## 5.48 tools/swMacro.h File Reference

### Defines

- #define [BLOCKNUM64K](#) 64
- #define [EPS](#) 1e-6
- #define [DEBUG](#)
- #define [LOG](#)(format,...) printf("File: "\_\_FILE\_\_",Line: %05d: "format"\n", \_\_LINE\_\_, ##\_\_VA\_ARGS\_\_)

### Typedefs

- typedef int [swInt](#)
- typedef int [swInt32](#)
- typedef long [swInt64](#)
- typedef double [swFloat](#)
- typedef float [swFloat32](#)
- typedef double [swFloat64](#)

#### 5.48.1 Define Documentation

**5.48.1.1** #define [BLOCKNUM64K](#) 64

**5.48.1.2** #define [DEBUG](#)

**5.48.1.3** #define [EPS](#) 1e-6

**5.48.1.4** #define [LOG](#)(format, ...) printf("File: "\_\_FILE\_\_",Line: %05d: "format"\n", \_\_LINE\_\_, ##\_\_VA\_ARGS\_\_)

#### 5.48.2 Typedef Documentation

**5.48.2.1** typedef double [swFloat](#)

**5.48.2.2** typedef float [swFloat32](#)

**5.48.2.3** typedef double [swFloat64](#)

**5.48.2.4** typedef int [swInt](#)

**5.48.2.5** typedef int [swInt32](#)

**5.48.2.6** typedef long [swInt64](#)

## 5.49 topology/topology.C File Reference

```
#include <stdlib.h>
#include <iostream>
#include <math.h>
#include <assert.h>
```

## 5.50 topology/topology.H File Reference

```
#include <stdlib.h>
#include "swMacro.h"
#include "topology.C"
```

### Classes

- class [Topology](#)

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