MPI_Bcast

Broadcasts a message from the process with rank "root" to all other processes of the group.

Synopsis

```
#include "mpi.h"
int MPI_Bcast ( buffer, count, datatype, root, comm )
void             *buffer;
int               count;
MPI_Datatype      datatype;
int               root;
MPI_Comm          comm;
```

Input/output Parameters

buffer - starting address of buffer (choice)

count - number of entries in buffer (integer)

datatype - data type of buffer (handle)

root - rank of broadcast root (integer)

comm - communicator (handle)

Algorithm

If the underlying device does not take responsibility, this function uses a tree-like algorithm to broadcast the message to blocks of processes. A linear algorithm is then used to broadcast the message from the first process in a block to all other processes. `MPIR_BCAST_BLOCK_SIZE` determines the size of blocks. If this is set to 1, then this function is equivalent to using a pure tree algorithm. If it is set to the size of the group or greater, it is a pure linear algorithm. The value should be adjusted to determine the most efficient value on different machines.

Notes for Fortran

All MPI routines in Fortran (except for `MPI_WTIME` and `MPI_WTICK`) have an additional argument `ierr` at the end of the argument list. `ierr` is an integer and has the same meaning as the return value of the routine in C. In Fortran, MPI routines are subroutines, and are invoked with the `call` statement.

All MPI objects (e.g., `MPI_Datatype`, `MPI_Comm`) are of type `INTEGER` in Fortran.

Errors

All MPI routines (except `MPI_Wtime` and `MPI_Wtick`) return an error value; C routines as the value of the function and Fortran routines in the last argument. Before the value is returned, the current MPI error handler is called. By default, this error handler aborts the MPI job. The error handler may be changed with `MPI_Errhandler_set`; the predefined error handler `MPI_ERRORS_RETURN` may be used to cause error values to be returned. Note that MPI does *not* guarentee that an MPI program can continue past an error.

MPI_SUCCESS - No error; MPI routine completed successfully.

MPI_ERR_COMM - Invalid communicator. A common error is to use a null communicator in a call (not even allowed in `MPI_Comm_rank`).

MPI_ERR_COUNT - Invalid count argument. Count arguments must be non-negative; a count of zero is often valid.

MPI_ERR_TYPE - Invalid datatype argument. May be an uncommitted

MPI_Datatype (see `MPI_Type_commit`).

MPI_ERR_BUFFER - Invalid buffer pointer. Usually a null buffer where one is not valid.

MPI_ERR_ROOT - Invalid root. The root must be specified as a rank in the communicator. Ranks must be between zero and the size of the communicator minus one.

Location:bcast.c