

Stages: i=initialization, s=starting, c=completion, f=freeing

Blk: b=blocking, nb=nonblocking

Loc: l=local, nl=non-local

Bold: exceptions b+l and nb+nl

lxx: Using names with "l", lx2 = "l" means incomplete and immediate,

ln = "l" means only incomplete, lm = "l" means only immediate

op: part of operation type: b-op = blocking operation,

nb-op = nonblockin operation, p-op = persistent operation

collective procedures:

- C = all processes of the group must call the procedure
- sq = in the same sequence
- S1 = blocking synchronization, S2 = start-complete-synchronization

Remarks:

- 1) Must not return before the corresponding MPI_receive operation is started.
- 2) In a correct MPI program, this a call to MPI_RSEND requires that the receiver has already started the corresponding receive. Under this assumption, the call is local.
- 3) In case of a MPI_(l)BARRIER, the S1/S2 synchronization is required (instead of "may or may not")
- 4) and also may not return until MPI_INIT has been called in the children

Procedure	Stages	Blk	Loc	lxx	op	collective C sq S1/2	blocked resources and remarks
MPI_SEND	i-s-c-f	b	nl		b-op	-	
MPI_SSEND	i-s-c-f	b	nl		b-op	-	1)
MPI_RSEND	i-s-c-f	b	nl		b-op	-	2)
MPI_BSEND	i-s-c-f	b	l		b-op	-	
MPI_RECV	i-s-c-f	b	nl		b-op	-	
MPI_ISEND, MPI_ISSEND, MPI_IRSEND	i-s----	nb	l	lx2	nb-op	-	buffer
MPI_Irecv	i-s----	nb	l	lx2	nb-op	-	buffer
corresponding MPI_Wait	----c-f	b	nl		nb-op	-	
corr. MPI_TEST returning flag=TRUE	----c-f	b	l		nb-op	-	
corr. MPI_TEST returning flag=FALSE	-----	nb	l		nb-op	-	buffer cached on req
MPI_IBSEND	i-s----	nb	l	lx2	nb-op	-	buffer
corresponding MPI_Wait	----c-f	b	l		nb-op	-	
corr. MPI_TEST returning flag=TRUE	----c-f	b	l		nb-op	-	
corr. MPI_TEST returning flag=FALSE	-----	nb	l		nb-op	-	buffer cached on req
MPI_PROBE	i-s-c-f	b	nl		b-op	-	
MPI_Iprobe	i-s-c-f	b	l	lm	b-op	-	
MPI_RECV of a probed message	i-s-c-f	b	l		b-op	-	
MPI_Irecv of a probed message	i-s----	nb	l	lx2	nb-op	-	buffer
corresponding MPI_Wait	----c-f	b	l		nb-op	-	
corr. MPI_TEST returning flag=TRUE	----c-f	b	l		nb-op	-	
corr. MPI_TEST returning flag=FALSE	-----	nb	l		nb-op	-	buffer cached on req
MPI_MPROBE	i-s-c-f	nb	nl		b-op	-	message handle
MPI_IMPROBE	i-s-c-f	nb	l	lx2	b-op	-	message handle
MPI_MRECV of a probed message	i-s-c-f	b	l		b-op	-	
MPI_IMRECV of a probed message	i-s----	nb	l	lx2	nb-op	-	buffer
corresponding MPI_Wait	----c-f	b	l		nb-op	-	
corr. MPI_TEST returning flag=TRUE	----c-f	b	l		nb-op	-	
corr. MPI_TEST returning flag=FALSE	-----	nb	l		nb-op	-	buffer cached on req
MPI_(- S R)SEND_INIT, MPI_RECV_INIT	i-----	nb	l		p-op	-	buffer address
corresponding MPI_START, MPI_STARTALL	--s----	nb	l		p-op	-	buffer content
corresponding MPI_Wait	----c--	nb	nl		p-op	-	buffer address on req
corr. MPI_TEST returning flag=TRUE	----c--	nb	l		p-op	-	buffer address on req
corr. MPI_TEST returning flag=FALSE	-----	nb	l		p-op	-	buffer cached on req
corr. MPI_REQUEST_FREE (for inactive req-handle)	-----f	b	l		p-op	-	

Procedure	Stages	Blk	Loc	lxx	op	collective C sq S1/2	blocked resources and remarks
MPI_BSEND_INIT	i-----	nb	l		p-op	-	buffer address
corresponding MPI_START, MPI_STARTALL	--s----	nb	l		p-op	-	buffer content
corresponding MPI_Wait	----c--	nb	l		p-op	-	buffer address on req
corr. MPI_TEST returning flag=TRUE	----c--	nb	l		p-op	-	buffer address on req
corr. MPI_TEST returning flag=FALSE	-----	nb	l		p-op	-	buffer cached on req
corr. MPI_REQUEST_FREE (for inactive req-handle)	-----f	b	l		p-op	-	
MPI_CANCEL of ...						-	(TO-DO)
MPI_SENDDRECVC(_REPLACE)	i-s-c-f	b	nl		b-op	-	
MPI_COMM_CREATE	i-s-c--	b	nl		b-op	C sq S1	coll. over comm arg.
MPI_COMM_CREATE_GROUP	i-s-c--	b	nl		b-op	C sq S1	coll. over group arg.
MPI_COMM_DUP, MPI_COMM_DUP_WITH_INFO, MPI_COMM_SPLIT, MPI_COMM_SPLIT_TYPE, MPI_CART_CREATE, MPI_GRAPH_CREATE, MPI_DIST_GRAPH_CREATE_ADJACENT, MPI_DIST_GRAPH_CREATE, MPI_CART_SUB: see MPI_COMM_CREATE							
MPI_INTERCOMM_CREATE, MPI_INTERCOMM_MERGE	i-s-c--	b	nl		b-op	C sq S1	coll. over union of local & remote group
MPI_COMM_IDUP	i-s----	nb	l	lx2	nb-op	C sq	communicator handle
corresponding MPI_Wait	----c--	b	nl		nb-op	C S2	
corr. MPI_TEST returning flag=TRUE	----c--	b	l		nb-op	C S2	
corr. MPI_TEST returning flag=FALSE	-----	nb	l		nb-op		
MPI_COMM_FREE	-----f	b	nl		b-op	C sq S1	see, 6.4.3, Adv. to impl.
MPI_BCAST and others	i-s-c-f	b	nl		b-op	C sq S1	3)
MPI_IBCAST and others	i-s----	nb	l	lx2	nb-op	C sq	buffer, 3)
MPI_IGATHERV and other ... V / ... W	i-s----	nb	l	lx2	nb-op	C sq	buffer, array arguments
corresponding MPI_Wait	----c--	b	nl		nb-op	C S2	3)
corr. MPI_TEST returning flag=TRUE	----c--	b	l		nb-op	C S2	3)
corr. MPI_TEST returning flag=FALSE	-----	nb	l		nb-op		
MPI_BCAST_INIT and others	i-----	nb	nl		p-op	C sq S1	buffer address
MPI_GATHERV_INIT and other ... V /... W _INIT	i-s----	nb	nl		p-op	C sq S1	buffer address, array arguments
corresponding MPI_START, MPI_STARTALL	--s----	nb	l		p-op	C	buffer content, 3)
corresponding MPI_Wait	----c--	nb	nl		p-op	C S2	buffer address and array arguments cached on the request handle, 3)
corr. MPI_TEST returning flag=TRUE	----c--	nb	l		p-op	C S2	buf-addr&arr-args on req, 3)
corr. MPI_TEST returning flag=FALSE	-----	nb	l		p-op		buf-addr&arr-args on req
corr. MPI_REQUEST_FREE	-----f	b	nl		p-op	C sq S1	see, 6.4.3, Adv. to impl.
MPI_INIT	i-s-c-f	b	nl		b-op	C sq S1	collective over MPI_COMM_WORLD
MPI_FINALIZE	i-s-c-f	b	nl		b-op	C sq S1	collective over all connected processes
MPI_COMM_SPAWN,_MULTIPLE	i-s-c-f	b	nl		b-op	C sq S1	collective over comm, 4)
MPI_COMM_ACCEPT, MPI_COMM_CONNECT	i-s-c-f	b	nl		b-op	C sq S1	collective over comm
MPI_FILE ... Routines							(TO-DO)