



# **MPI 2.1 at MPI Forum Chicago, April 28-30, 2008 Version 1.3 – Combined Document**

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**MPI 2.1**  
Slide 1

Höchstleistungsrechenzentrum Stuttgart



## MPI-1.3 – Working Plan

- MPI-1.3 final version Apr. 19, 2008 is available
- Reviews are done by the MPI 1.3 reviewing group:
  1. **Bill Gropp**
  2. **Rolf Rabenseifner**
  3. **Adam Moody**
  4. **Puri Bangalore**
  5. **Terry Dontje**
- Text basis:  
MPI-1.1 (June 1995), MPI-1.2 (July 1997), MPI-1 errata (Oct. 12, 1998), Ballot 1+2 (May 15, 2002), and Ballot 4 items 5, 10.e, 13, and 15
- Official reading:  
The reviewers are asked for there (formalized) reviews.
- If there are still bugs that must be fixed, then an additional version will be done for the 1<sup>st</sup> vote, otherwise this version Apr. 19, 2008 is final.
- This is the official reading.  
Therefore, such late modifications must be presented in this meeting.
- Final version → 1<sup>st</sup> vote June, 2<sup>nd</sup> vote Sep. 2008



## Reviewer Question & Answer

MPI-1.3, Apr. 19, 2008 represents fully and exactly (as I can overlook) the text that was given by

- MPI-1.1 (June 1995)
- MPI-1.2 (Chapter of MPI-2, July 1997)
- MPI-1 errata (Oct. 12, 1998),
- Ballot 1+2 (May 15, 2002),
- Ballot 4 (protocol from March 2008 meeting, official reading), items 5, 10.e, 13, and 15

if the following bugs will be corrected until first vote in June 2008 meeting:

- YYYYYY.

Further comments (not official part of this review):

- ZZZZZZ



## Reviewer Statements

### Question:

Is the MPI-1.3 document now ready for 1st vote in the next meeting?

Yes:

21

No:

0

Abstain:

3

MPI-1.3, Apr. 19, 2008 represents fully and exactly (as I can overlook) the text that was given by MPI-1.1 (June 1995), MPI-1.2 (Chapter of MPI-2, July 1997), MPI-1 errata (Oct. 12, 1998), Ballot 1+2 (May 15, 2002), Ballot 4 (protocol from March 2008 meeting, official reading), items 5, 10.e, 13, and 15 if the following bugs will be corrected until first vote in June 2008 meeting: YYYYYY.

Further comments (not official part of this review): ZZZZZ

Reviewer	Statement is true	YYYYYY (Bugs, to be done)	ZZZZZ (Further comments)
Bill Gropp			
Rolf Rabenseifner	YES	P213 [7] [8]	Thank you to Rainer Keller and all reviewers.
Adam Moody	YES	P51.6+29 .GT. P94. pro+data in pdf	
Puri Bangalore	YES	P116.last line move P150.47 move If no problems on next pages P160.28+29 too long Ref. [27], [28]	
Terry Dontje	YES		

# Annex: Slides from Jan. 2008 meeting



MPI 2.1  
Slide 5

Rolf Rabenseifner  
Höchstleistungsrechenzentrum Stuttgart

H L R I S 

# Schedule based on official rules

## Rules and Procedures

1. Here is a reminder of the traditional MPI voting rules, which have served us well. These rules have been extended to the email discussion of MPI erratas and have been applied to the errata ballots. We expect to adapt these rules, preserving their spirit, as we go forward.
2. One vote per organization
3. To vote, an organization must have been present at the last two MPI Forum meetings.
4. **Votes are taken twice, at separate meetings. Votes are preceded by a reading at an earlier meeting, to familiarize everyone with the issues.**
5. Measures pass on a simple majority.
6. Only items consistent with the charter can be considered.

From [http://www.mpi-forum.org/mpi2\\_1/index.htm](http://www.mpi-forum.org/mpi2_1/index.htm)

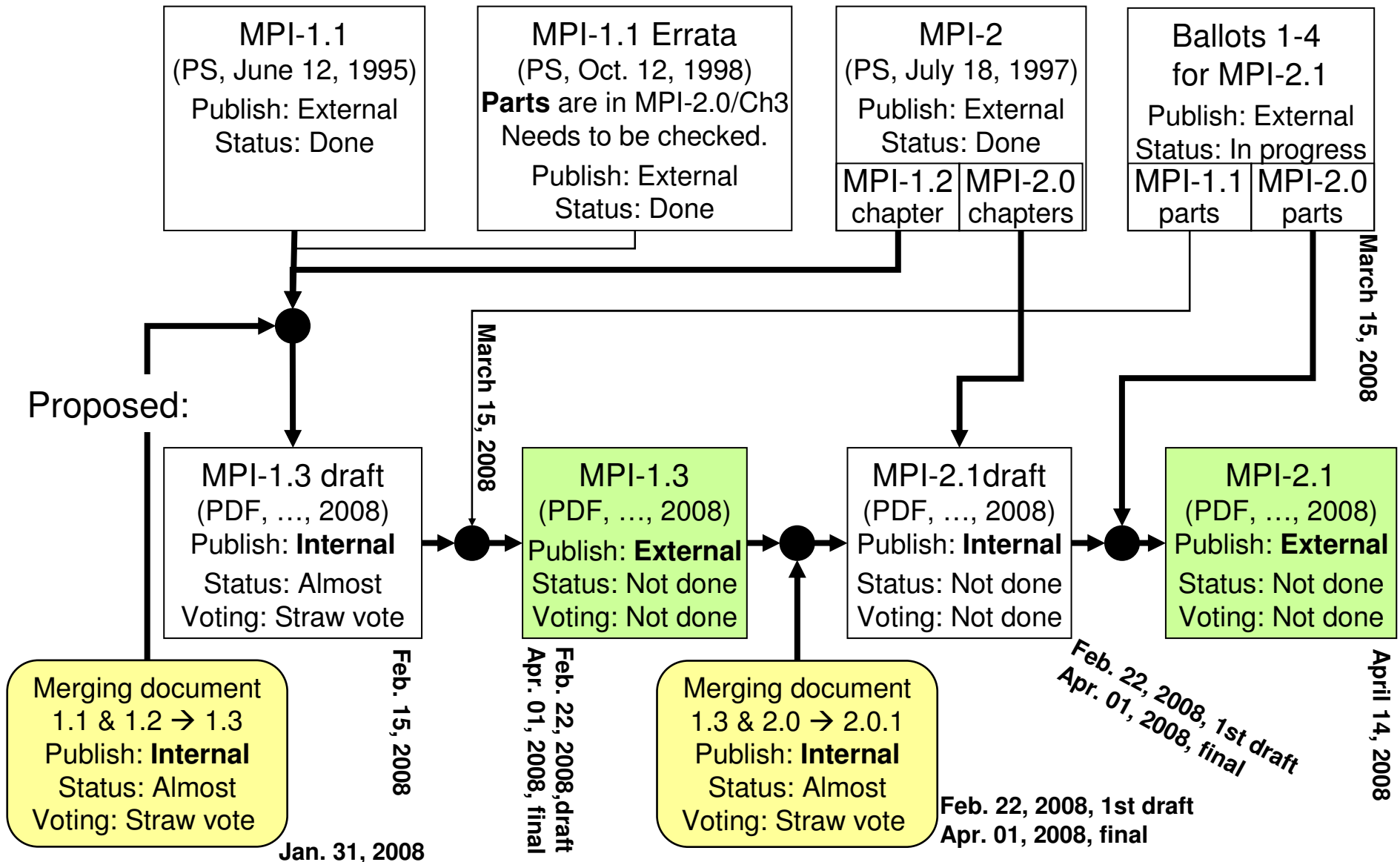
### For **MPI x.x combined documents**:

This reading at the MPI Forum meetings will be substituted by a review report through a review group. Each Forum member can be part of this group.

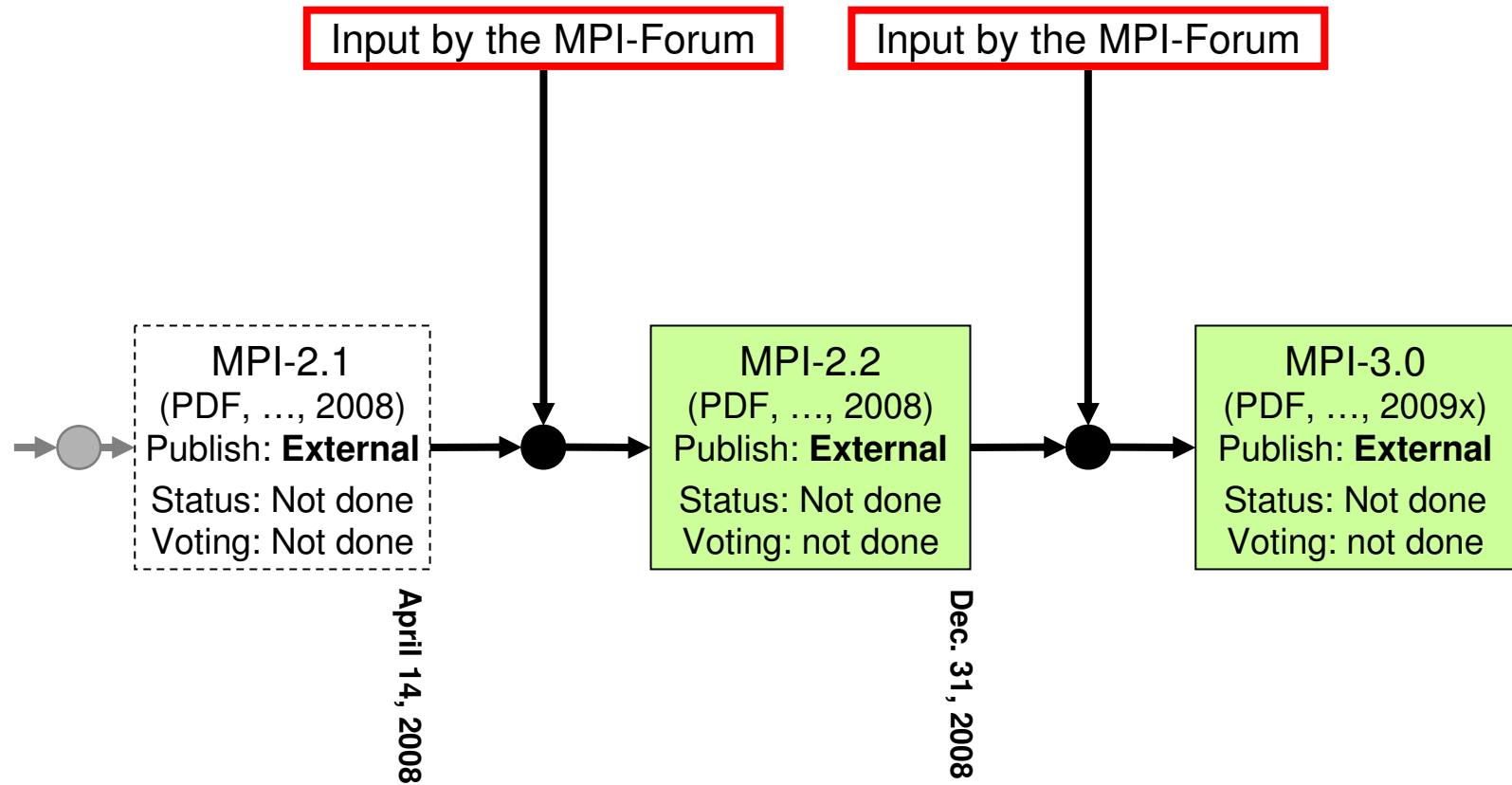
With the 1st official vote on a combined document (at next meeting), this modification of the voting rules is accept for that document.

# MPI Standards document plan

Existing and in progress:



# MPI Standards document plan





## MPI 1.2.1 or MPI 1.3

- Should we name it MPI 1.3 instead of 1.2.1, including the change in MPI\_GET\_VERSION to MPI 1.3?
  - Yes: all-11
  - No: 2
  - Abstain: 9
- The rest of the document plan is okay?
  - Yes: all
  - No: 0
  - Abstain: 0



## MPI 1.3 combined document

- MPI 1.1 + Chap. 3 of MPI-2 (Version 1.2 of MPI) + some errata will be combined to  
→ **MPI 1.3 combined document**
  - Jan.08 meeting:  
**Short discussion and defining a review group** who is reviewing the **MPI 1.3 merging plan** (printed copies available) and the **MPI 1.3 combined document**
  - See e-mail: From: Rainer Keller, Subject: Re: [mpi-21] Documents  
Date: Mon, 7 Jan 2008 12:13:14 +0100
  - Reporting by e-mail on mpi-21 reflector
  - Corrections if necessary
  - Final report of the reviewers at March 2008 meeting
  - **1st vote** by the MPI Forum at April 2008 meeting
  - **2nd (final) vote** by the MPI Forum at June 2008 meeting



## MPI 1.3 combined document

**Question:**

**Should  
we  
include**

**MPI-2-  
chapter3  
+all new  
MPI-1  
errata  
into the  
combined  
MPI 1.3?**

**Yes:**

**All-1**

**No:**

**0**

**Abstain:**

**1**

- Do we want to include the MPI 1.1 errata already into this MPI 1.3 document?
- Pro:
  - This document is a “final” document telling the MPI-1 standard.
- Con:
  - Formally, it is not the right place. New stuff must be in MPI 2.1.
- My recommendation:
  - The “pro” outweighs the “con”.

## MPI 1.3 combined document – the “merging document”

### Question:

Is the  
new  
history  
text  
okay?

Yes:

all

No:

0

Abstain:

0

Merge of MPI-1.1 (June 1995) and MPI-1.2 (July 1997) plus new Errata (MPI 1.2.1, 2008)

Versions-History page:

**Version 1.3: ?????, 2008.** This document combines the previous documents MPI 1.1 (June 12, 1995) and the MPI 1.2 Chapter in MPI-2 (July 18, 1997). Additional errata collected by the MPI Forum referring to MPI 1.1 and MPI 1.2 are also included in this document.

New text

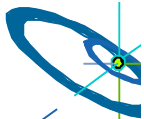
**Version 1.2: July, 18 1997.** The MPI-2 Forum introduced MPI 1.2 as Chap.3 in the standard "MPI-2: Extensions to the Message-Passing Interface", July 18, 1997. This section contains clarifications and minor corrections to Version 1.1 of the MPI Standard. The only new function in MPI-1.2 is one for identifying to which version of the MPI Standard the implementation conforms. There are small differences between MPI-1 and MPI-1.1. There are very few differences ~~(only those discussed in this chapter)~~ between MPI-1.1 and MPI-1.2, but large differences ~~(the rest of this document)~~ between MPI-1.2 and MPI-2.

This text is  
from MPI  
2.0, page 21,  
lines 14-19,  
but  
parentheses  
removed

**Version 1.1: June, 1995.** Beginning in March, 1995, the Mes...

**Version 1.0: June, 1994.** The Message Passing Interface Forum (MPIF), with participation from over 40 organizations, ...

Existing  
MPI 1.1 text

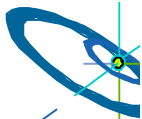


## MPI 1.2 combined document – the “merging document”

- 3.1: Integrated MPI\_Get\_version into Environmental Section, Inquiries -- from MPI-2, p. 21 (changes to appLang.tex and inquiry.tex)
  - \* the section title in MPI-2 is "Version Number", should not be changed?
  - \* MPI-2.0 Sect. 3.1 page 21 line 21 - page 22 line 2 added as new Sect. 7.1.1 in MPI-1.1 before current MPI-1.1 Sect 7.1.1 on page 190 line 21 remove last sentence on MPI-2.0 page 22 line 2: "Its C++ binding can be found in the Annex, Section B.11."
- 3.2: MPI-1.0 and MPI-1.1 Clarifications
  - \* MPI-2.0 page 22 lines 4-10 not used (removed)
- 3.2.1: MPI\_INITIALIZED: -- from MPI-2, p. 21 lines 14-15
  - \* added in MPI-1.1 page 200 line 11.
  - \* MPI-1.1 page 200 lines 10-11 must be modified because MPI\_GET\_VERSION
  - \* maybe also called before MPI\_Init (And MPI\_FINALIZED in MPI-2.0):  
Changed: "is the only function that may be called before" to  
"It is one of the few routines that "
- 3.2.2: Include clarification of MPI\_FINALIZE -- from MPI-2, p. 22 line 18 - p. 24 line 48:  
Replaces MPI-1.1 paragraph page 199 lines 46-48

## MPI 1.2 combined document – the “merging document”

- 3.2.3 Clarification of status after MPI\_WAIT and MPI\_TEST -- from MPI-2, p. 25 lines 2-12  
Position in standard not completely obvious.  
Fits best after the definition of empty statuses in MPI-1, 3.7.3  
\* i.e., after MPI-1.1 page 41 line 20
- 3.2.4 Clarification of MPI\_INTERCOMM\_CREATE -- from MPI-2, p. 25.  
Added to the section on Inter-Communication  
\* Delete the text in parenthesis on MPI-1.1 page 158 line 31.  
\* Substitute the sentence MPI-1.1 page 155 lines 36-37  
by MPI-2.0 page 25 lines 37-47
- 3.2.5 Clarification of MPI\_INTERCOMM\_MERGE -- from MPI-2, p. 26 lines 2-4  
Added paragraph on errorhandlers to MPI\_INTERCOMM\_MERGE  
\* after MPI-1.1 page 160 line 13
- 3.2.6 Clarification of MPI\_TYPE\_SIZE -- from MPI-2, p. 26 lines 11-13  
Added advice to users  
\* after MPI-1.1 page 70 line 43



## MPI 1.2 combined document – the “merging document”

### Question:

Is the merging decision for MPI-2 Sect.3.2.7 okay?

See next slide!

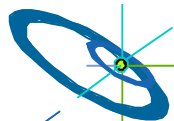
### - 3.2.7 Clarification of MPI\_REDUCE -- from MPI-2, p. 26

Required extensive modification:

- \* MPI-2.0 page 26 lines 22-28 is substituting the text on MPI-1.1 page 114 lines 25-26.
- \* The sentence MPI 1.1, page 114, lines 26-27 “**User-defined operators may operate on general, derived datatypes.**” is not removed.
- \* MPI-2.0 page 26 lines 29-35 must be added after MPI-1.1 page 114 line 30.
- \* No need for additional new text "This is further explained in Section 4.9.4"

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Review of this proposal on the next slide.



Question:

Is the merging decision for MPI-2 Sect.3.2.7 okay?

Yes:

all

No:

0

Abstain:

0

This sentence is kept although MPI-2 requires deleting. (The content is correct)

## MPI 1.2 combined document – the “merging document” New proposal on Jan 2008 meeting

- 3.2.7 Clarification of MPI\_REDUCE -- from MPI-2, p. 26

**Blue: MPI 1.1, page 114, lines 25-30** **Purple: MPI-2.0, page 26, lines 22-34**

~~The datatype argument of MPI\_REDUCE must be compatible with op. Predefined operators work only with the \MPI/ types listed in Sec. \ref{coll-predefined-op} and Sec. \ref{coll-minloc-maxloc}. The datatype argument of MPI\_REDUCE must be compatible with op. Predefined operators work only with the MPI types listed in Section 4.9.2 \ref{coll-predefined-op} and Section 4.9.3 \ref{coll-minloc-maxloc}. Furthermore, the datatype and op given for predefined operators must be the same on all processes.~~

Note that it is possible for users to supply different user-defined operations to MPI\_REDUCE in each process. MPI does not define which operations are used on which operands in this case. **User-defined operators may operate on general, derived datatypes.** In this case, each argument that the reduce operation is applied to is one element described by such a datatype, which may contain several basic values. This is further explained in Section~\ref{subsec:coll-user-ops}.

*Advice to users.* Users should make no assumptions about how MPI\_REDUCE is implemented. Safest is to ensure that the same function is passed to MPI\_REDUCE by each process. (*Advice to users.*)

Overlapping datatypes are permitted in “send” buffers. Overlapping datatypes in “receive” buffers are erroneous and may give unpredictable results.



## MPI 1.2 combined document – the “merging document”

- 3.2.8 Clarification of Error Behaviour of Attribute Callback Function -- from MPI-2, p. 26 lines 38-39  
Added to section 5.7.1, right after definition of delete\_fn  
\* i.e., after MPI-1.1 page 170 line 7



## **MPI 1.2 combined document – the “merging document”**

### **Question:**

**Should we keep the rationale MPI-2 Sect.3.2.9 page 27 line 1-32?  
See next slides.**

**- 3.2.9 Clarification of MPI\_PROBE and MPI\_Iprobe -- from MPI-2, p. 27**

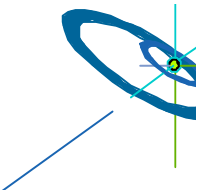
**Replaced text, left out rationale...**

- \* The rationale may be kept, but all references should be**
- \* referencing the MPI 1.1 document (and not the new combined document)**
- \* TODO: Decision on Rationale must be done by MPI-2.1 Forum.**

**The location for the rationale would be directly after the paragraph with the substituted text, i.e., after MPI 1.1, page 52, line 4.**

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**Decision by the MPI-Forum (on next slides): The rationale is removed.**



## MPI 1.2 combined document – the “merging document”

### - 3.2.9 Clarification of MPI\_PROBE and MPI\_Iprobe -- from MPI-2, p. 27

Page 52, lines 1 thru 3 (of MPI 1.1, the June 12, 1995 version without changebars)

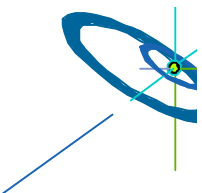
**A subsequent receive executed with the same context, and the source and tag returned in status by MPI\_Iprobe will receive the message that was matched by the probe, if no other intervening receive occurs after the probe. If the receiving process is multi-threaded, it is the user's responsibility to ensure that the last condition holds.**

become:

**A subsequent receive executed with the same communicator, and the source and tag returned in status by MPI\_Iprobe will receive the message that was matched by the probe, if no other intervening receive occurs after the probe, and the send is not successfully cancelled before the receive. If the receiving process is multi-threaded, it is the user's responsibility to ensure that the last condition holds.**

#### *Rationale.*

The following program shows that the **original** MPI-1.1 definitions of cancel and probe are in conflict:



## MPI 1.2 combined document – the “merging document”

### - 3.2.9 Clarification of MPI\_PROBE and MPI\_Iprobe -- from MPI-2, p. 27

#### *Rationale.*

The following program shows that the **original** MPI-1.1 definitions of cancel and probe are in conflict:

```
Process 0
-----
MPI_Init();
MPI_Isend(dest=1);

MPI_Barrier();
MPI_Cancel();
MPI_Wait();
MPI_Test_cancelled();
MPI_Barrier();
```

```
Process 1
-----
MPI_Init();

MPI_Probe();
MPI_Barrier();

MPI_Barrier();
MPI_Recv();
```



## MPI 1.2 combined document – the “merging document”

### Question:

Should we keep the rationale MPI-2 Sect.3.2.9 page 27 line 1-32?

Yes:

0

No:

All-7

Abstain:

7

### - 3.2.9 Clarification of MPI\_PROBE and MPI\_Iprobe -- from MPI-2, p. 27

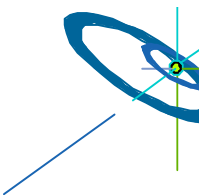
Since the send has been cancelled by process 0, the wait must be local (MPI 1.1, page 54, line 13) and must return before the matching receive. For the wait to be local, the send must be successfully cancelled, and therefore must not match the receive in process 1 (MPI 1.1, page 54 line 29).

However, it is clear that the probe on process 1 must eventually detect an incoming message. MPI 1.1, p. Page 52 line 1 makes it clear that the subsequent receive by process 1 must return the probed message.

The above are clearly contradictory, and therefore the text “...and the send is not successfully cancelled before the receive” must be added to MPI 1.1, line 3 of page 54.

An alternative solution (rejected) would be to change the semantics of cancel so that the call is not local if the message has been probed. This adds complexity to implementations, and adds a new concept of “state” to a message (probed or not). It would, however, preserve the feature that a blocking receive after a probe is local.

*(End of rationale.)*



## MPI 1.2.1 combined document – Review Group

- The review group has to check the merging locations shown in the “merging document” from Rainer Keller
- They have to check the final “combined document”, whether it implements the decisions in the “merging document”
- Proposal:
  - At least 4 persons to check the “merging document” and the final combined document based on the decisions in the merging document
  - MPI 1.3 reviewing group:
    1. **Bill Gropp** (@meeting Jan-2008)
    2. **Rolf Rabenseifner** (@meeting Jan-2008)
    3. **Adam Moody**
    4. **Puri Bangalore**
    5. **Terry Dontje** (not @meeting Jan-2008)
    6. **William Yu** (not @meeting Jan-2008)

action  
point

action  
point

