Reflections on the MPI Process

Steven Huss-Lederman

September 25, 2017

Celebrating 25 Years of MPI

EuroMPI

Chicago, IL

- I worked on large scientific computations including parallel processing
- I became involved in the MPI standards process
  - For MPI-1 I lead the Initial Implementation Subset effort
    - this is the only section acknowledgement for which there is no text in the standard
      - » a singularly unique accomplishment!
  - For MPI-1.2/2.0 lead the External Interfaces and was editor
    - there is a section in the standard!

I'll Try To Tell The Truth

- Want to fact check? Check out the MPI standard in standard formats
  - Go to http://mpi-forum.org/docs/
    - MPI-1 is available in postscript or compressed (.Z) format
    - By MPI-1.1 you can get PDF and HTML
    - By MPI-2.1 you could no longer get postscript ☹ but
      - » you could get a color version ☺
      - » you could get a reduced file size version to save 1.8 MB!
  - Some comes from the fading memory of my brain
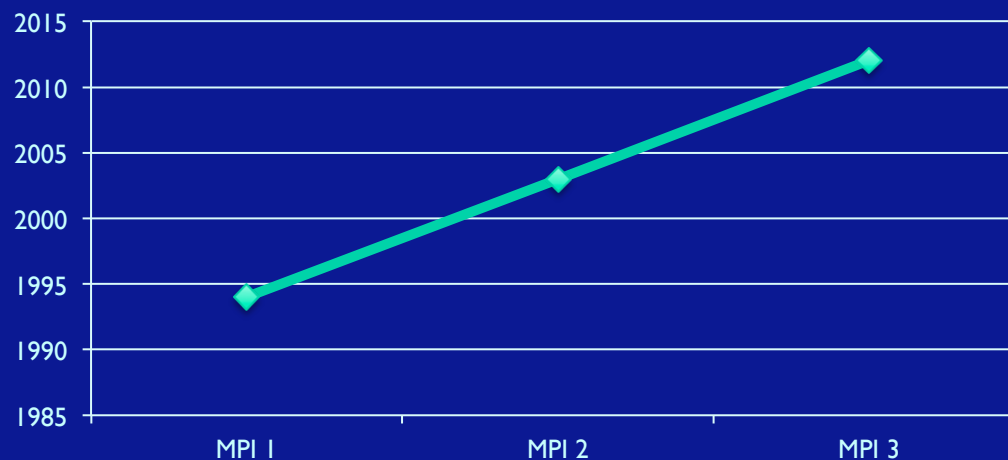   - but soon you can read it with brain interfaces to get the real truth

For The Young People In the Audience

- Beloit College produces a yearly Mindset List
  - it tell what people entering college that year did not experience in their lifetimes so college faculty can understand them
- The MPI Mindset List might be
  - MPI (aka MPI-1.0) (11/92-5/94)
    - "Cheers" end as MPI begins
    - The Barbie Liberation Organization switches voices with GI Joe
    - The X-files begin
  - MPI-2.0 (11/03)
    - Cell phones had a camera
    - Human Genome project is completed

MPI Of The Future

- MPI-6.0 (2039)
  - AI systems design new MPI standard for nostalgic purposes
  - CS students wonder why anyone would have to write imperative code for parallel computation
- The date is very precise because every 9 years a new MPI standard comes out[*]

MPI Progress with Time

	MPI 1	MPI 2	MPI 3
Year	1994	2003	2012

[*] based on incorrect date in official PDF version of MPI-2.0 of 2003 instead of 1997 but it works for me...

Time To Update From Base Version

Update	Years		
	MPI-1	MPI-2	MPI-3
#1	1	5	3
#2	9	6	
#3	14		

- I cannot seem to find an obvious pattern except it always needs correction and MPI tends to do an update when a new major version comes out

The Process

- Who was involved
- How did it work
- Why it worked

The Guilty Parties

- MPI-1
  - 63 people
  - ? organizations
  - 237 pages
- MPI-2
  - 122 people
  - 52 organizations
    - 24 companies, 14 labs/research, 14 universities
  - 370 pages
- MPI-3
  - 107 People
  - 40 organizations
    - 16 companies, 11 labs/research, 13 universities
  - 852 pages

Important Features of How It Worked

- Decided to be a de facto standard
  - takes years to become ISO, IEEE, etc.
  - would likely have been obsolete or bypassed if took too long
- Range of people from companies, labs/research & universities
  - balance between types of people (companies slightly more)
  - the people generally had hands-on, practical experience in message passing
- Each organizations had only one vote
  - could not increase power with more people
- Organization had to have attended two of last three meetings to vote
  - you had to be active
- Met every 6 weeks
  - keep process moving and people did not forget details

Important Features of How It Worked

- Subcommittees
  - someone(s) in charge of making work happen
- Committee of whole
  - decisions done by everyone so global perspective on all issues
- Straw votes
  - let people know if ideas was going the right way

Important Features In Why It Worked

- Consistency of people involved
  - common understanding of issues, ongoing relationships
- Technical issues ruled
  - limited politics
  - not based on previous standards/software (API, etc.)

Important Features In Why It Worked

- Needed to approve items at two separate meetings
  - issues often noted with time to reflect
- The ideas were tested with actual software

Important Features In Why It Worked

- Groups that eat together can work together
  - common dinner once per meeting helped bond people

So …

- We didn't realize where MPI would go and it would live so long
  - if we did I would have slowed the process down and that would have been wrong
- As with Star Wars
  - you go back to prehistory, forward to future history and relive what you experienced
  - some people like the original, some people like the sequel, and some don't like the whole series