4-Day-Course — ZDV, University of Mainz — 1st day

Content

MPI on beginners’ level
1. MPI Overview
2. Process model and language bindings
3. Messages and point-to-point communication
4. Nonblocking communication

Schedule
08:30 Local registration
09:00 Welcome
09:15 Lectures and exercises on MPI (including some breaks)
13:00 Lunch break
14:00 Lectures and exercises on MPI (including some breaks)
18:00 Final end
Social event

4-Day-Course — ZDV, University of Mainz — 2nd day

Content

MPI on beginners’ level — continued
6,(1) Collective communication

Shared memory parallelization with OpenMP
Overview
Execution model
Worksharing directives
Worksharing – continued (Tasks …)
Data environment
Heat example (homework)
Summary
Pitfalls

Shared memory parallelization with OpenMP
Verifying an OpenMP Parallelization with the Intel Inspector XE

Schedule
08:45 Local registration
09:00 Lectures and exercises on MPI (including some breaks)
10:45 Lectures and exercises on OpenMP (including some breaks)
13:00 Lunch break
14:00 Lectures and exercises on OpenMP (including some breaks)
17:30 Verifying an OpenMP Parallelization with the Intel Inspector XE
18:00 Optional:
Exercises with the Intel Inspector XE
18:00/18:30 Final end without/with the exercise
4-Day-Course  —  ZDV, University of Mainz  —  3rd day

Content

MPI on intermediate level
7. Error handling
8. Groups & Communicators, Environment Management
   (1) MPI_Comm_split, intra- & inter-communicators
   (2) Advanced topics (short talk)
9. Virtual topologies
   (1) A multi-dimensional process naming scheme
   (2) Neighborhood-communication + MPI_BOTTOM
       (no practical)
   (3) Optimized re-numbering (short talk)
12. Derived datatypes
   (1) transfer any combination of typed data
19. Heat example

MPI on beginners’ level – continued (Fortran users only)
5. The New Fortran Module mpi_f08

Schedule
08:45 Local registration
09:00 Lectures & exercises on interim. MPI
       (including some breaks)
13:00 Lunch break
14:00 Lectures & exercises on interim. MPI
       (including some breaks)
17:30 For Fortran participants only:
       Additional lecture + exercises on
       the mpi_f08 module/interface
18:00 Final end

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4-Day-Course  —  ZDV, University of Mainz  —  4th day

Content

Advanced MPI
10. One-sided Communication
11. Shared Memory One-sided Communication
   (1) MPI_Comm_split_type & MPI_Win_allocate_shared
   (2) MPI memory models and synchronization rules (no pract.)
Short tour through
   6.(2) Advanced topics on collective communication
12.(2) Advanced topics on derived datatypes (title slide)
13. Parallel File I/O (title + 5 slides)
14. MPI and Threads (title +1 slide)
15. Probe, Persistent Requests, Cancel (title + 3 slides)
16. Process Creation and Management (title + 3 slides)
17. Other MPI features (regular 4 slides)
18. Best practice
MPI Summary

Shared memory parallelization with OpenMP
OpenMP-4.0 / 4.5 / 5.0 Extensions

Schedule
08:45 Local registration
09:00 Lectures & exercises on advanced MPI
       (including some breaks)
13:00 Lunch break
14:00 Lectures & exercises on advanced MPI
       (including some breaks)
16:45 For OpenMP users – optional:
       OpenMP-4.0 / 4.5 / 5.0 Extensions
18:00 Final end

Other options / for self-study:
Parallel Architectures and Programming Models
Parallelization of Explicit and Implicit Solvers
Parallel Performance Analysis and profiling

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