








6-Day-Course — ETH Zurich — 1st day — OpenMP

Content

Shared memory parallelization with OpenMP

- Overview 
- Execution model 
- Worksharing directives 
- Worksharing – continued (Exe 2b) 
- Data environment 
- Heat example (on next day)
- Summary 
- Pitfalls 
- Q&A

Schedule


- 08:45 Login to ZOOM
(and establishing the break-out rooms)
- 09:00 Welcome
- 09:15 Lectures and exercises on OpenMP
(including some breaks)
- 12:30 Lunch break
- 13:30 Lectures and exercises on OpenMP
(including some breaks)
- 16:00 Final end

6-Day-Course — ETH Zurich — 2nd day — OpenMP


Content

Verifying an OpenMP Parallelization with the Intel Inspector XE

Shared memory parallelization with OpenMP (continued)

Heat example 

Advanced shared memory parallelization with OpenMP

OpenMP-4.0 / 4.5 / 5.0 Extensions 

Taskloops (talk+practical) 

Q & A

Schedule

- 08:45 Login to ZOOM
(and establishing the break-out rooms)
- 09:00 Lectures and exercises on OpenMP
(including some breaks)
- 12:30 Lunch break
- 13:30 Lectures and exercises on OpenMP
(including some breaks)
- 16:00 Final end

Content

MPI on beginners' level



1. MPI Overview

 2. Process model and language bindings

 3. Messages and point-to-point communication

- Heat example with MPI: (1) domain decomposition

Schedule

- 08:45 Login to ZOOM
(and establishing the break-out rooms)
- 09:00 Welcome
- 09:15 Lectures and exercises on MPI
(including some breaks)
- 12:45 Lunch break [15 Minutes later!]
- 13:45 Lectures and exercises on MPI
(including some breaks)
- 16:00 Final end

Content

MPI on beginners' level – continued



4. Nonblocking communication

 - 6.(1) Collective communication

- ### MPI on intermediate level
9. Virtual topologies
(1) A multi-dimensional process naming scheme

 7. Error handling
 12. Derived datatypes
(1) transfer any combination of typed data
(1st part until Exercise 1)

Additional self-paced exercise on MPI and Q&A

- Heat example with MPI: (2) halo communication
(3) reduction for abort criterion
(4) centralized result printing

Schedule

- 08:45 Login to ZOOM
(and establishing the break-out rooms)
- 09:00 Lectures and exercises on MPI
(including some breaks)
- 12:30 Lunch break
- 13:30 Lectures and exercises on MPI
(including some breaks)
- 16:00 Official end
- 16:00 Additional self-paced exercise and Q&A
- 17:00 End of additional Q&A

Content

MPI on intermediate/advanced level     

- 8. Groups & Communicators, Environment Management
 - (1) MPI_Comm_split, intra- & inter-communicators
 - (2) Rank re-numbering, inter-communicators, ... (short talk + quiz)
- 9. Virtual topologies
 - (2) Neighborhood-communication + MPI_BOTTOM (no practical)
 - (3) Optimized re-numbering (short talk)
- 12. Derived datatypes
 - (1) Transfer any combination of typed data (2nd part with Exercise 2)
 - (2) Advanced topics on derived datatypes (short tour)

6.(2) Advanced topics on collective communication

Short tour through

- 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)

5. The New Fortran Module mpi_f08 (Fortran users only)



Schedule

- 08:45 Login to ZOOM (and establishing the break-out rooms)
- 09:00 Lectures & exercises on interm. MPI (including some breaks)
- 12:30 Lunch break
- 13:30 Lectures & exercises on advanced MPI (including some breaks)
- 16:00 End for C/C++/Python programmers
- 16:00 For Fortran participants only: Additional lecture + exercises on the mpi_f08 module/interface
- 16:30 Final end

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.)
- 18. Best practice

Q&A

MPI Summary

Schedule

- 08:45 Login to ZOOM (and establishing the break-out rooms)
- 09:00 Lectures & exercises on advanced MPI (including some breaks)
- 12:30 Lunch break
- 13:30 Lectures & exercises on advanced MPI (including some breaks)
- 16:00 Final end