Intel Developer Workshop

LRZ | 20 – 21 April 2026

Workshop materials:
https://tinyurl.com/hoap1s26-materials

Intel Developer Workshop

- This workshop is co-organised by the Leibniz Supercomputing Centre (LRZ) and Intel for the German National Competence Centre for High-Performance Computing SIDE.

Lecturers and Organisers

- **Lecturers (all Intel)**:
  - Heinrich Bockhorst
  - Tobias Kloeffel
  - Aleksandra Krawiec
  - Nisha Patel
  - Stefana Raileanu
  - Alina Shadrina
  - Igor Vorobtsov

- **Organisers**:
  - Tobias Kloeffel (Intel)
  - Nisha Patel (Intel)
  - Gerald Mathias (LRZ)
  - Volker Weinberg (LRZ)

Course Webpage

- All slides and other materials will be made available under:
- https://tinyurl.com/hoap1s26-materials
- Further information on:
  - Agenda
  - Social Event
  - Guided Tour
  - Slides
  - Hands-On Sessions
  - Survey

Agenda Day 1

Theme: oneAPI Overview & Intel LLVM Compilers (ICX/IFX)

Session	Topic	Details
09:00 – 09:30	Welcome & Workshop Overview	Opening, goals, logistics
09:30 – 10:00	Overall SW Stack & Intel Offerings	Intel software stack and positioning oneAPI toolkits, roadmap highlights
10:00 – 12:00	ICX/IFX – Part 1	Intel Compiler evolution; migration from ICC/IFORT to ICX/IFX; diagnostics & debugging; portability issues
12:00 – 13:00	**Lunch Break**	
13:00 – 15:00	ICX/IFX – Part 2	FP defaults & fp-model differences; optimization techniques; vectorization reports
15:00 – 15:30	oneDNN	oneDNN overview and usage scenarios
15:30 – 17:00	Hands-on Lab (CPU)	Compiler usage, flags, reports, migration exercises
18:00 – 20:00	**Social Networking Event (Gasthof Neuwirt, Garching)**	

Agenda Day 2

Theme: Libraries & Performance Analysis

Session	Topic	Details
09:00 – 09:30	MPI	Intel MPI usage and tips & tricks
09:30 – 10:30	VTune / APS	CPU performance analysis and profiling workflows
10:30 – 11:00	Advisor	Roofline model; threading; memory analysis
11:00 – 12:00	oneMKL – Part 1	oneMKL overview; dense BLAS & LAPACK
12:00 – 13:00	**Lunch Break**	
13:00 – 14:05	oneMKL – Part 2	sparse BLAS & sparse solvers
14:05 – 16:45	Hands-on Lab	Profiling, tuning and performance triage
16:45 – 17:00	Wrap-up & Q&A	Summary, feedback, next steps
17:00 – 18:00	**LRZ Guided Tour**	

Food and Drinks

- For coffee and lunch breaks we recommend the bistro, snack/coffee counter and coffee machines of Gastronomie Wilhelm in the TUM School of Computation, Information and Technology (CIT) building just next to the LRZ:

Social Event @ Gasthof Neuwirt Garching

- Date: Mon, 20 April 2026
- Time: 18:00 – 20:00 CEST

- Fee: Dinner at own expense

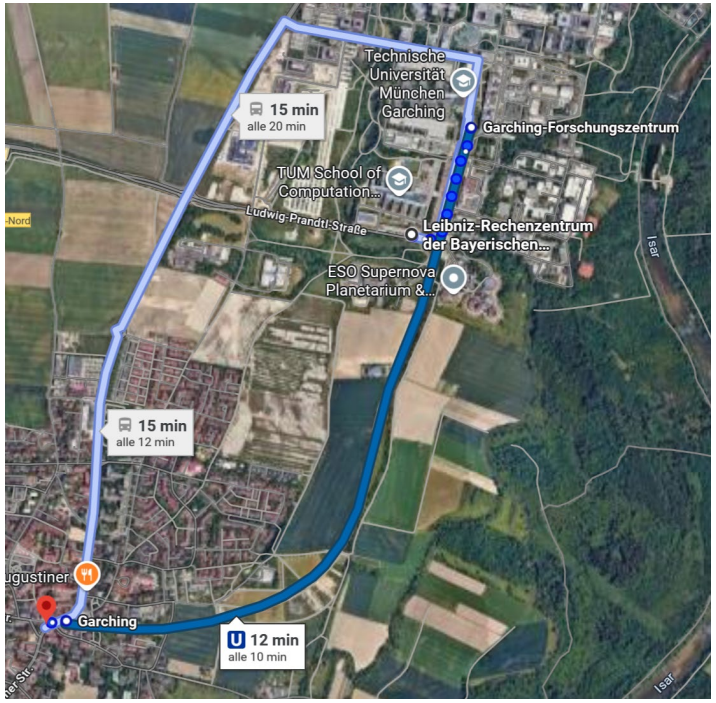
- Location:

  Gasthof Neuwirt Garching
  Münchener Str.10
  85748 Garching

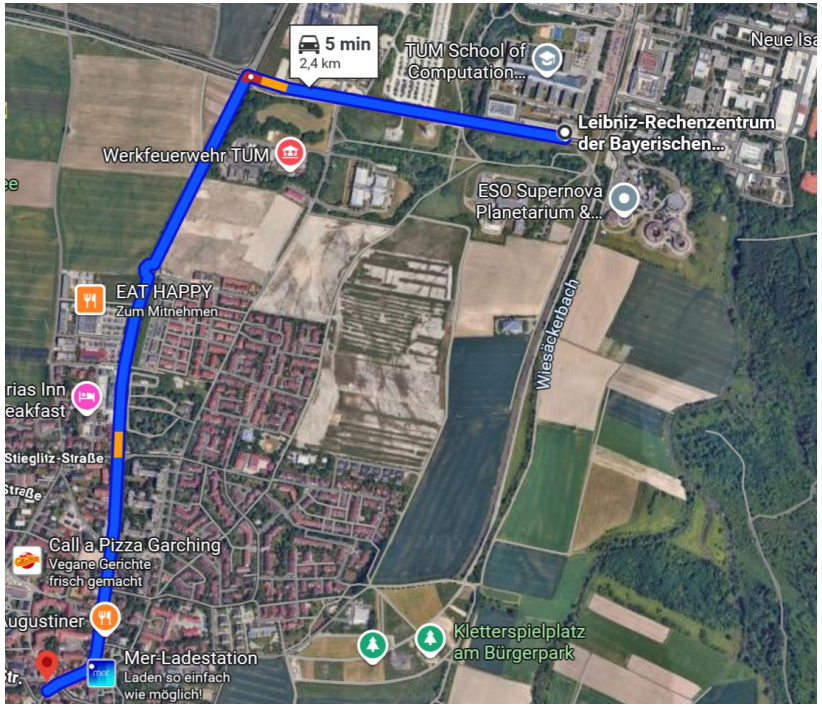
Social Event @ Gasthof Neuwirt Garching

by walking

by public transport



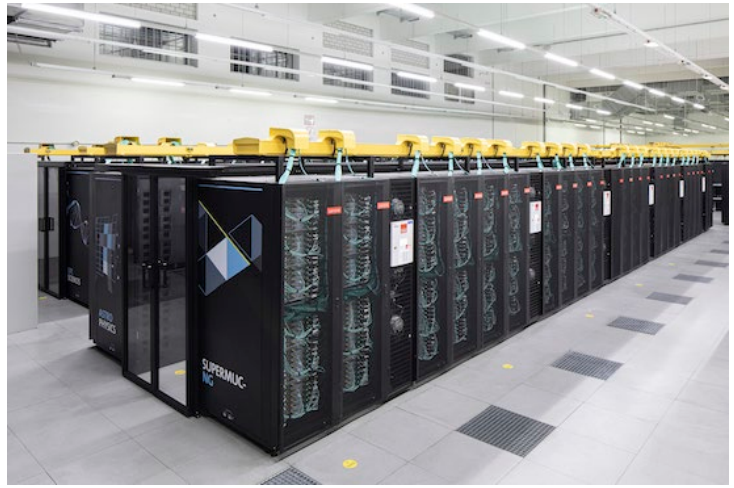
by car

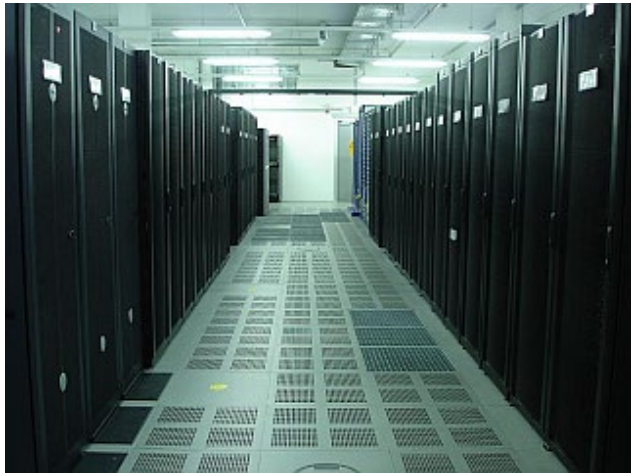


Guided Tour

- **Only for people who registered for the guided tour during online registration or on the first day.**

- **Date**: Tue, 21 April 2026,
- **Time**: 17:00 - 18:00 CEST
- **Attention**: You will need a photo ID to enter the compute cube!





CoolMUC-4

- See https://doku.lrz.de/coolmuc-4-1082337877.html

Hardware Architecture

Login Nodes

Architecture	Number of login nodes	Number of physical cores	Memory	Operating system
Intel(R) Xeon(R) Platinum 8380 CPU (Ice Lake)	2	80	1 TB	SLES 15 SP6

Compute Nodes

Architecture	Number of nodes	Number of cores per node	Total number of cores	Memory per node	Operating system	local temporary file system (attached to the node)	temporary file system (across all nodes)	Remarks
Intel(R) Xeon(R) Platinum 8380 CPU (Ice Lake)	12	80	480	1 TB	SLES 15 SP6	1.7 TB via "/tmp" (SSD)	$SCRATCH_DSS	New CoolMUC-4 Usage: Job Processing on the Linux-Cluster
Intel(R) Xeon(R) Platinum 8480+ (Sapphire Rapids)	106	112	11872	512 GB				
Intel(R) Xeon(R) Platinum 8360HL CPU (Cooper Lake)	1	96	96	6 TB				Already existing Large Memory Teramem System Usage: Job Processing on the Linux-Cluster

Using the System

- Login to CoolMUC-4:

```
ssh -X cool.hpc.lrz.de -l hpckurs??
```

Replace `hpckurs??` with the account name provided during the course.

MFA: 2nd factor = tbd.

Using the System

- Load Modules:

```
lu65fok@cm4login2:~> module switch stack/24.6.0
spack/release/sles15.6/24.6.0 icelake

lu65fok@cm4login2:~> module load intel-toolkit
Notice: No version specified. Loading version: 'intel-toolkit/2025.3.0'.
Note: You are loading a complete Base and HPC Intel-OneAPI toolkit / environment.
      This will remove any conflicting modules
      already loaded in your environment
Loading intel-toolkit/2025.3.0
  Loading requirement: intel/2025.3.0 intel-mpi/2021.17.0 intel-mkl/2025.3.0 intel-inspector/2024.1.0 intel-dnn/2025.3.0
    intel-itac/2022.4.0 intel-tbb/2022.3.0 intel-ipp/2022.3.0 intel-dal/2025.6.0 intel-ippcp/2025.3.0
    intel-dpl/2022.10.0 intel-dpct/2025.3.0

lu65fok@cm4login1:~> module load intel-legacy-compilers
Notice: No version specified. Loading version: 'intel-legacy-compilers/2021.6.0'.
lu65fok@cm4login1:~>
```

Reservation on CoolMUC-4

```
lu65fok@cm4login1:~> scontrol -Mcm4 show reservation hoap1s26
ReservationName=hoap1s26 StartTime=2026-04-20T09:00:00 EndTime=2026-04-21T17:00:00
Duration=1-08:00:00
   Nodes=cm4r13c01s[01-02] NodeCnt=2 CoreCnt=224 Features=(null) PartitionName=(null)
Flags=MAINT,OVERLAP,IGNORE_JOBS,SPEC_NODES
   TRES=cpu=448
   Users=lu65fok,di97fod,lu43jih,di75yas,di49zop,a2815ae,di75tal,di97gef,di93jun,di93cos,hpck
urs00,hpckurs01,hpckurs02,hpckurs03,hpckurs04,hpckurs05,hpckurs06,hpckurs07,hpckurs08,hpckurs
09,hpckurs10,hpckurs11,hpckurs12,hpckurs13,hpckurs14,hpckurs15,hpckurs16,hpckurs17,hpckurs18,
hpckurs19,hpckurs20,di38cir,di46loj,di35ful,di54web,di98biw3,di54wev Groups=(null)
Accounts=(null) Licenses=(null) State=INACTIVE BurstBuffer=(null) Watts=n/a
   MaxStartDelay=(null)

lu65fok@cm4login1:~> sbatch --reservation=hoap1s26 job.sh
```

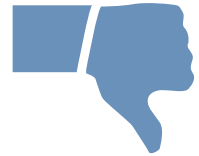
And now …

Enjoy the workshop!

Survey

- Please fill out the online survey under

https://tinyurl.com/hoap1s26-survey

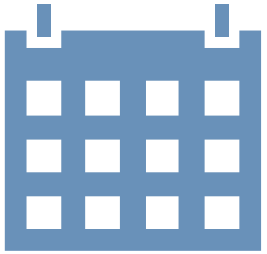


- This helps us to
  - increase the quality of the courses,
  - design the future training programme at LRZ according to your needs and wishes,
  - get future funding for training events.

Certificate of Attendance

- A digital certificate of attendance for the whole workshop will be sent to you in the next couple of days if you have attended at least 1.5 days of the workshop.

Upcoming Courses and Workshops



- **Information on further courses:**
  - by LRZ: http://www.lrz.de/services/compute/courses/
  - by the Gauss Centre of Supercomputing (GCS): https://www.gauss-centre.eu/trainingsworkshops
  - by German Centres: https://veranstaltungen.hpc-in-deutschland.de/
  - by European Centres and Projects: https://hpc-portal.eu/training

Mailing Lists

- Subscribe via https://lists.lrz.de/mailman3/lists/training-announce.lists.lrz.de/ to get regular information on education and training events at LRZ.

- Subscribe via https://www.lrz.de/wir/newsletter/ to get the general LRZ newsletter.

Thank you!
We hope to see you again in a future training event!