Teaching of HKHLR

Hessisches Kompetenzzentrum für Hochleistungsrechnen (HKHLR)

Tim Jammer, Anja Gerbes, René Sitt

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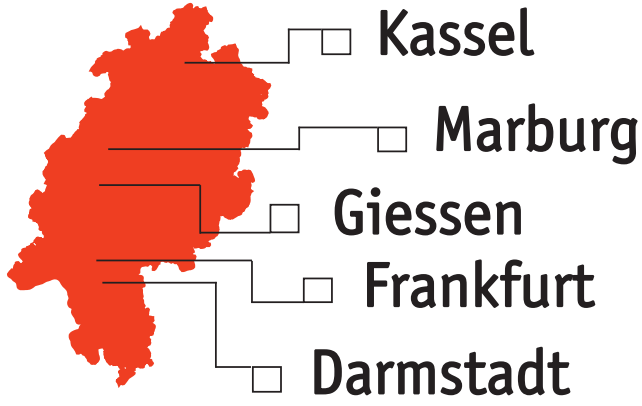

HKHLR is funded by the Hessian Ministry of Sciences and Arts

Outline

- In this talk:

- Brief introduction of the HKHLR
- Skills hessian cluster users need
- Course offering of HKHLR
  - Focus: ProTHPC
- Conclusion

What is the HKHLR?

- Competence Center for High Performance Computing in Hessen

- Training
- Consulting
- Information
- Monitoring

Participarting universities:

TECHNISCHE UNIVERSITÄT DARMSTADT

GOETHE UNIVERSITÄT FRANKFURT AM MAIN

JUSTUS-LIEBIG-UNIVERSITÄT GIESSEN

Philipps Universität Marburg

UNIKASSEL VERSITÄT

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HESSEN

Minimal Skill Set

- K1.1-B System Architectures
  - Used architecture is different for each location
- USE1-B Cluster Operating System
  - No fundamental differences between sites
- K4-B Job Scheduling
  - Marburg, Gießen use Grid Engine
  - Darmstadt, Frankfurt, Kassel use SLURM

- Only some users need
  - USE3-B Building of Parallel Programs

Course Offering of HKHLR

- Location specific cluster introduction
  - Regular cluster introduction at every location (additional if required)
- ProTHPC
  - Proficiency Training High Performance Computing
  - Three times per year
  - HPC basics
- HiPerCH
  - High Performance Computing in Hessen
  - Annually
  - Changing advanced or specific HPC topics
- Other tutorials and workshops as needed
  - Like courses on C++, OpenMP, MPI, ...

Format ProTHPC

- 3 times per year
- Rotating location in Hessia
- Free of charge for all academia
- Three days of training
- Seperate registration for specific modules
- Each trainer may give each course

- March 2019: Marburg
- June 2019: Darmstadt
- September 2019: Gießen

Content ProTHPC

- Linux and Shell Scripting
- Batch Job Scheduling
- Building Software Applications in Linux (Make)
- Introduction to Version Control with GIT
- Parallel Debugging with Totalview

- Each module contains a large "hands-on" part

- Half-day course

- Teaches Skill USE1-B: Cluster Operating System
  - Command Line
  - Shell Scripting
  - Use of the module system

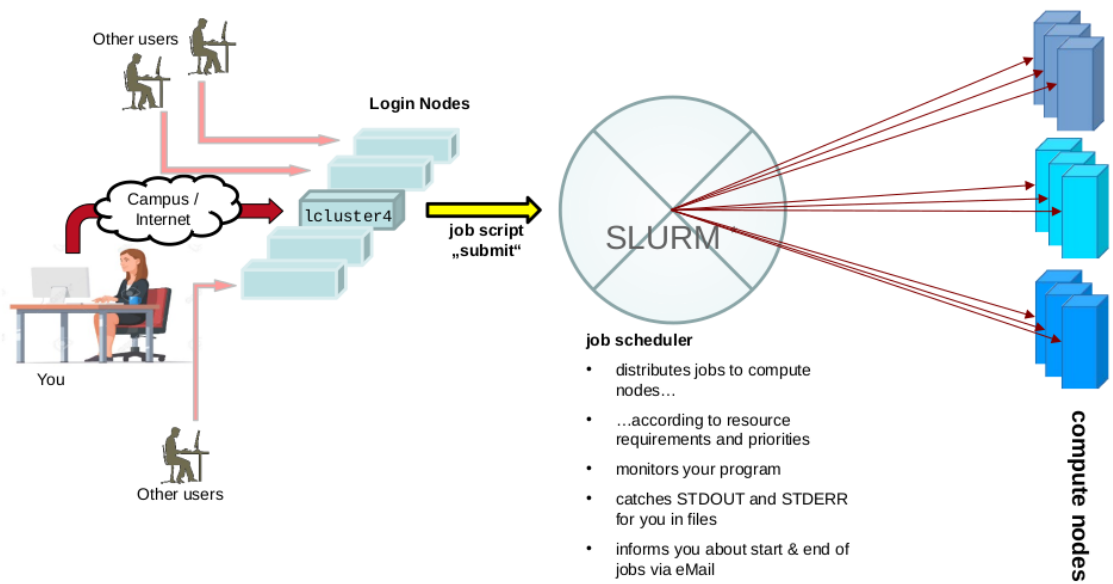
```
#!/bin/bash

for i in 1 2 3 10 11 hundred; do
  echo "Print i = $i"
done
```

Batch Job Scheduling

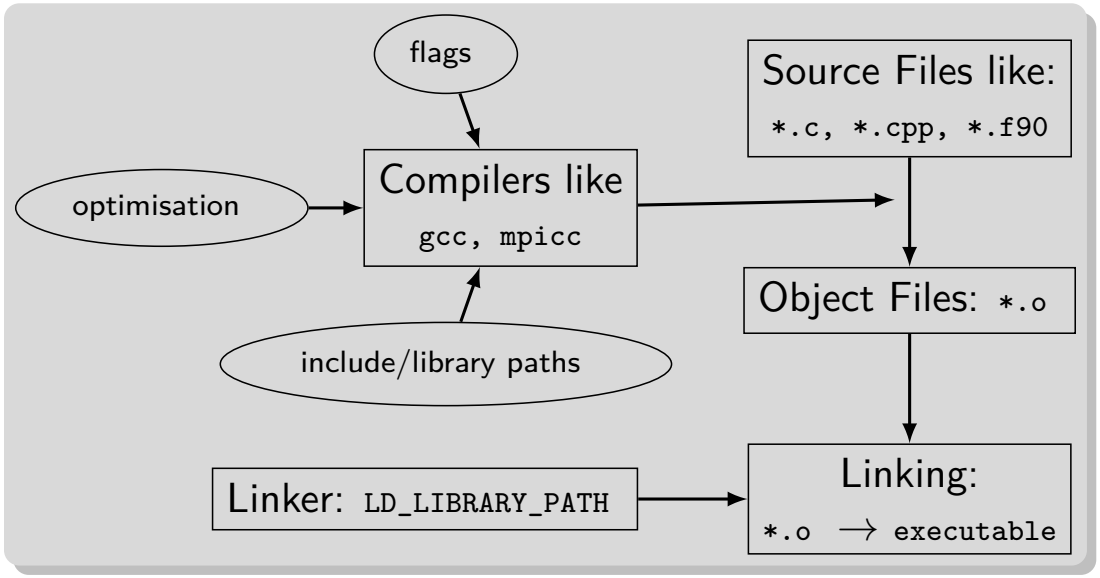
- Half-day course

- Teaches Skill K4-B: Job Scheduling
- Scheduler used (Slurm or Grid Engine) depends on location where the course is offered



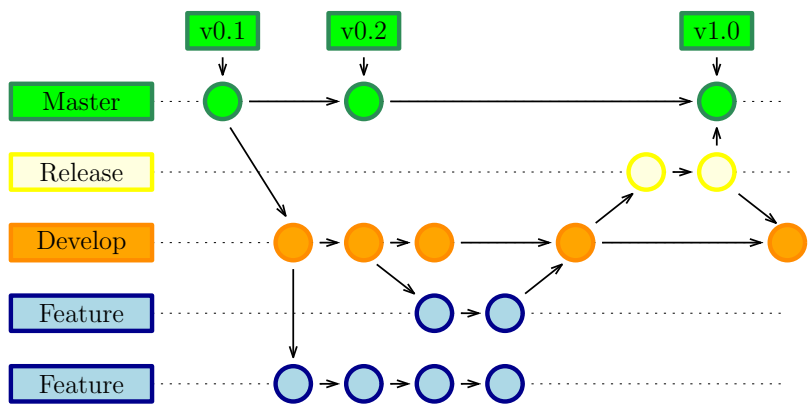
- Half-day course
- Teaches Skill USE3-B: Building of Parallel Programs

Automatic build using `make` and Makefiles



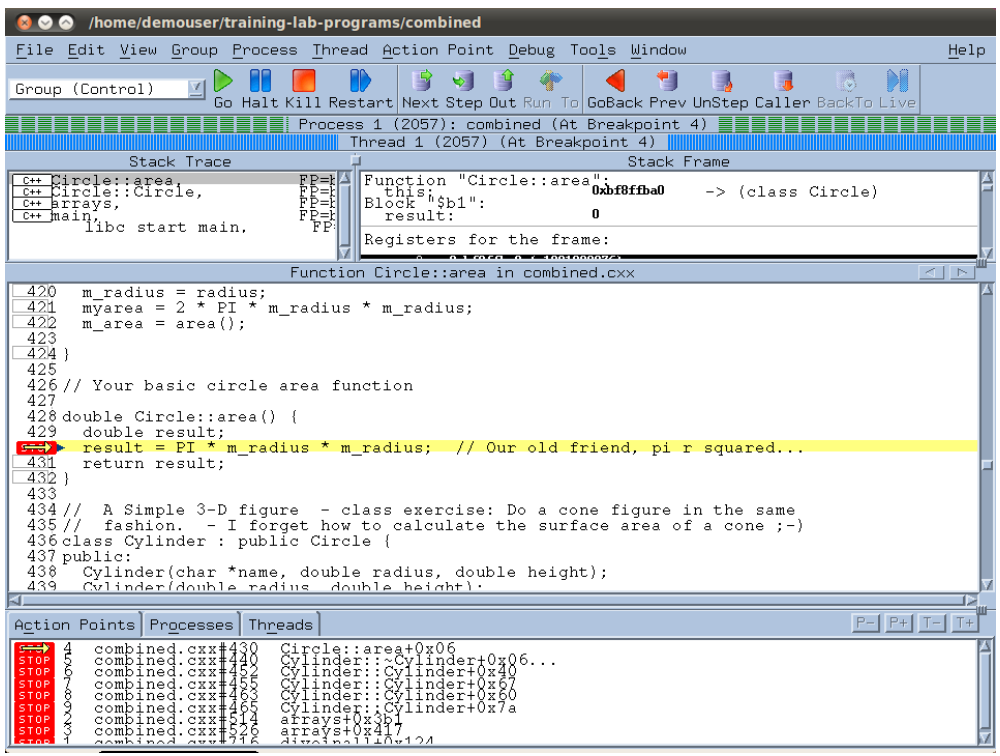
- Half-day course

- Teaches Skill SD3.2-B: Version Control
- No HPC specific skills
- Rather version control is useful for all kinds of projects



Parallel Debugging with Totalview

- Full-day course
- Teaches Skill SD2.2-B: Debugging



Train the Minimal Skill Set

- K1.1-B System Architectures
  - Trained by: Cluster Introduction at every Location
- USE1-B Cluster Operating System
  - Trained by: ProtHPC module 1: Linux and Shell Scripting
- K4-B Job Scheduling
  - Trained by: ProtHPC module 2: Batch Job Scheduling

- Some Users also need
  - USE3-B Building of Parallel Programs
  - Trained by: ProtHPC module 3: Building Software Applications in Linux

Outlook: Next HiPerCH

- 23.09.19 - 27.09.19 in Darmstadt
- Focus on Deep Learning on HPC systems
- Workshop on Fortran modernization in cooperation with NAG.

- More Information: `https://www.hkhlr.de/en/events/hiperch-11-2019-09-23`

Conclusion

- Very high demand in basic training
- Participants prefer local courses

- HKHLR developed ProTHPC training
  to satisfy the need for training of HPC basics in Hessia