



Sajjad Azizi

Garching near Munich, 5 December 2024

Certificate of Attendance

Sajjad Azizi has attended the following 3-days online course on 3 – 5 December 2024, 09:00 – 16:00 CET:

Node-Level Performance Engineering

This online course organised in cooperation with NHR@FAU covers performance engineering approaches on the compute node level. It conveys the required knowledge to develop a thorough understanding of the interactions between software and hardware. This process must start at the core, socket, and node level, where the code gets executed that does the actual computational work. The course introduces the basic architectural features and bottlenecks of modern processors and compute nodes.

Topics covered include:

- Computer architecture for software developers
- Tools: topology & affinity, frequency
- Introduction to the roofline model
- Tools: performance counters
- Performance engineering: basic skills
- Optimal use of parallel resources: SIMD and ccNUMA
- Roofline case studies
- The ECM performance model

In total, the course consisted of approx. 16.5 hours of lectures interleaved with many hands-on sessions on a Linux cluster at NHR@FAU. The lectures were given by Prof. Dr. Gerhard Wellein and Dr. habil. Georg Hager (both NHR@FAU).

Dr. Volker Weinberg
Head of Education and Training

