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## **Parallel Performance Analysis at Scale: From Single Node to one Million HPC Cores**

**Bernd Mohr**  
Jülich Supercomputing Centre  
Forschungszentrum Jülich  
Jülich , Germany

### **ABSTRACT**

Current high-end HPC systems consist of complex configurations of potentially heterogeneous components. In addition, the hard- and software configuration can change dynamically due to fault recovering processes or power saving efforts. Deep hierarchies of large, complex software components are needed to operate and use them. Developing efficient and high-performance application software for these systems is challenging. Therefore, sophisticated performance measurement and analysis capabilities are required.

The talk will discuss the current state-of-the-art in freely available open-source parallel performance measurement and analysis tools. A special focus will be on the issues of portability, insightfulness, integration, and capability of performance tools. It will provide further details on the Score-P, Scalasca and Cube tools developed and maintained at Jülich Supercomputing Centre, one of the leading HPC computing centres in Europe. Next, some tool usage success stories will be presented. The talk will conclude with a discussion of current issues and potential future research opportunities.

### **SPEAKER BIOGRAPHY AND PHOTO**

Bernd Mohr started to design and develop tools for performance analysis of parallel programs already with his diploma thesis (1987) at the University of Erlangen in Germany, and continued this in his Ph.D. work (1987 to 1992). During a three year postdoc position at the University of Oregon, he designed and implemented the original TAU performance analysis framework. Since 1996 he has been a senior scientist at Forschungszentrum Jülich. Since 2000, he has been the team leader of the group "Programming Environments and Performance Analysis". Besides being responsible for user support and training in regard to performance tools at the Jülich Supercomputing Centre (JSC), he is leading the Scalasca performance tools efforts in collaboration with Prof. Felix Wolf of TU Darmstadt. Since 2007, he also serves as deputy head for the JSC division "Application support". He was an active member in the International Eascale Software Project (IESP/BDEC) and work package leader in the European (EESI2) and

Juelich (EIC, ECL) Exascale efforts. For the SC and ISC Conference series, he serves on the Steering Committee. He is the author of several dozen conference and journal articles about performance analysis and tuning of parallel programs.

