

Scalability for Petaflops systems

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Abstract. Future very high end systems, petaflops computers, will be megaprocessors or megacores with a million or more active processors. This can be derived both by extrapolation of the processor number of the leading systems in the TOP500 and by the consideration of multi- and many-core microprocessors for energy efficiency reasons. Part of processors could also be application specific accelerators as latest microprocessor architectures support interfaces to such devices. The large number of processors will also impose fault tolerance strategies making the system architectures highly heterogeneous and dynamic. To sum up: petaflops systems will be massively parallel and use heterogeneous and dynamic processor arrangements. Such architectures pose the question of scalability and programmability in general. The talk describes the challenges of such systems for existing application programs, programming languages and models as well as programming tools.