

Keynote 4: Can Parallel Software Catch up with Parallel Hardware? Trends in Automatic Parallelization

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Supercomputers have to be proved powerful for various fields including the development of advanced technologies such as large-scale scientific and engineering computing, new material manufacture, nuclear fusion simulation, and automotive design. On October 20, 2004, NEC Corporation announced the availability of their new supercomputer 'SX-8', the world's most powerful vector supercomputer with a peak processing performance of 65TFLOPS. In last few years, the hardware of supercomputers has undergone rapid development – from Earth simulator to SX-8, only goes through 3 years – the peak performance of SX-8 exceeds 1.8 times over Earth Simulator. However, the parallel software – especially parallel programming tools – is still underdevelopment. We still use MPI, High Performance Fortran and OpenMP mostly for our parallel programming tasks. In fact, these languages and libraries are difficult to use for most of scientific and engineering users. In this talk, we will outlook the some of the existing parallel language and automatic parallelization tools and also, we will address the potential technologies of automatic parallelization. Finally, we summarize how parallel software to make effort to catch up with the development of supercomputer hardware.