

## To Virtualize or Not to Virtualize

With memory and interconnect hierarchies growing ever deeper, processors architectures promising heterogeneity and widening data parallelism, and fears of rampant failures, the question arises as to how many of these features should be revealed to programmers. To what extent can and should they be hidden through sophisticated compiler optimizations, managed runtimes, and underlying system software mechanisms? Programming models that have had the highest impact in High Performance Computing have carefully balanced the needs of programmers to gain performance through careful optimization and the necessity of hiding some of the machine details to enable portability and conceptual simplicity. The experience of the PGAS languages over the past two decades and the growing gap between current programming models and the future hardware, gives us some important insight into what technical challenges are most critical and what features of new programming models are essential in impacting the user community.