CSI Computer Science Seminar Series

CSI Computer Science

Cloud Computing Programming Model — Challenges and Solutions

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Abstract: Cloud computing has emerged rapidly as a growing paradigm of on-demand access to computing, data and software utilities using a usage-based billing model. Users essentially rent resources and pay for what they use and everything including software, platform, and infrastructure is as a service. In this talk, I will give a review of supercomputing, cluster computing, grid computing and cloud computing. Comparisons of these computing domains and programming models, their limitations and potential solutions will be included in this talk. In particular, I will point out the shortcomings and limitations of current cloud computing programming models and propose possible solutions. Current MapReduce model and its variants have succeeded in data-parallel applications such as database operations and web searching; however, they are still not effective for compute-intensive applications such as many graph applications. We propose several approaches to solving this problem through extension of current programming models, automatic translation from sequential codes to cloud codes, simple API and framework built on current cloud models, detection of data and task parallelism, and their efficient scheduling. Some preliminary theoretical and experimental results will also be reported in this talk.

Biography: Yi Pan is a Distinguished University Professor of the Department of Computer Science and an Interim Associate Dean at Georgia State University, USA. Dr. Pan received his B.Eng. and M.Eng. degrees in computer engineering from Tsinghua University, China, in 1982 and 1984, respectively, and his Ph.D. degree in computer science from the University of Pittsburgh, USA, in 1991. His profile has been featured as a distinguished alumnus in both Tsinghua Alumni Newsletter and University of Pittsburgh CS Alumni Newsletter. Dr. Pan's research interests include parallel and cloud computing, wireless networks, and bioinformatics. Dr. Pan has published more than 150 journal papers with over 50 papers published in various IEEE journals. In addition, he has published over 150 papers in refereed conferences. He has also co-authored/co-edited 37 books. His work has been cited more than 3950 times. Dr. Pan has served as an editor-in-chief or editorial board member for 15 journals including 7 IEEE Transactions. He is the recipient of many awards including IEEE Transactions Best Paper Award, IBM Faculty Award, JSPS Senior Invitation Fellowship, IEEE BIBE Outstanding Achievement Award, NSF Research Opportunity Award, and AFOSR Summer Faculty Research Fellowship. He has organized many international conferences and delivered over 40 keynote speeches at various international conferences around the world.