浙江大学网络传感与控制研究组

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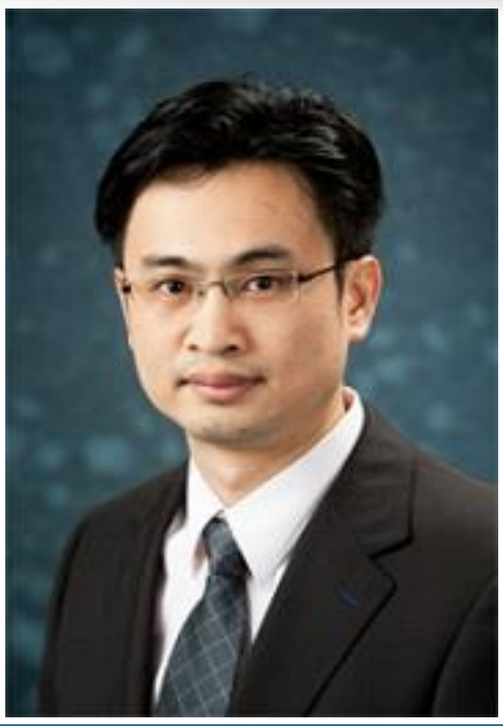
學術報告

Energy-Efficient Dynamic Provisioning in Data Centers: The Benefit of Seeing the Future



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***Biography*: Minghua Chen received his B.E. and M.S. degrees at Tsinghua University. He received his Ph.D. degree from EECS at UC Berkeley. He visited Microsoft Research Redmond as a Postdoc Researcher. He is currently an Associate Professor of the Department of Information Engineering, The Chinese University of Hong Kong, and an Adjunct Associate Professor in THU. He received the Eli Jury award from UC Berkeley and The Chinese University of Hong Kong Young Researcher Award. He is currently an Associate Editor of the IEEE/ACM ToN. His recent research interests include energy systems, intelligent transportation, distributed optimization, multimedia networking, wireless networking, network coding, and delay-constrained network information flow.**

Energy consumption represents a significant cost in data center operation. Dynamic provisioning techniques aim at saving this portion of the energy. In dynamic provisioning, it is a common approach to predict future workload to certain extent and exploit the information to achieve good performance. This naturally leads to the following fundamental questions: 1. Can we design solutions that require zero future workload information, called online solutions? 2. Can we characterize the benefit of knowing future workload information in dynamic provisioning? In this work, we develop online dynamic provisioning solutions with and without future workload information available. We first reveal an elegant structure of the off-line dynamic provisioning problem. We then exploit this insight to design two online algorithms. We demonstrate 20-71% of energy saving in a case study using real-world traces.