UCF DEPARTMENT OF ELECTRICAL ENGINEERING AND COMPUTER SCEINCE

Spring 2015 Seminar Series

Presented by the CS Division

AUTO-TUNING PERFORMANCE OF DATA-INTENSIVE SYSTEMS IN CLOUD COMPUTING

FRIDAY APRIL 10, 2015

11:00 AM – HEC 438

Today, data-intensive computing systems, such as scientific computing or big data applications, may involve large-scale computing resources and complex software and hardware components. In this talk, I will introduce one of my latest projects that uses adaptive resource management enabled by the container-based virtualization technique to automatically tune performance of parallel programs in cloud. In this project, the containers running on physical hosts can dynamically allocate CPU resources to parallel processes according to the current program execution state and system resource status. The resource allocations are adjusted by two ways: the intra-host level, which dynamically makes resource adjusted within a host; and the inter-host level, which migrates containers together with processes from one host to another. We have implemented and evaluated our approach on Amazon EC2 platform, which demonstrates that the performance can be improved up to 31.1% (with an average of 15.6%). In this talk, I will also go over our other work on big data, including an optimization technique for Hadoop Distributed File System (HDFS), which utilizes asynchronous multi-pipeline data transfers instead of a single-pipeline stop-and-wait mechanism in the current HDFS. Such a technique can improve the data transfer throughput of HDFS by 27-245%.

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Liqiang Wang is a Castagne Associate Professor in the Department of Computer Science at the University of Wyoming. He received Ph.D. in Computer Science from Stony Brook University in 2006. His research focuses on an interdisciplinary area overlapping big data, cloud computing, and program analytics, which includes design and analysis. In the aspect of design, he is working on optimizing performance, scalability, resilience of data-intensive computing, especially on Cloud, GPU, and multicore platforms. In the aspect of analysis, he focuses on using hybrid program analysis to detect and avoid programming errors in large-scale parallel computing systems. He is the recipient of a number of awards including NSF CAREER Award in 2011, Castagne Faculty Fellow Award of University of Wyoming in 2013, and NSFC Overseas Scholar Collaborative Research Award in 2014.

Hosted by: Dr. Lotzi Boloni