Abstract:

Providing quality-of-service guarantees by means of fair sharing has never been more challenging in datacenters. Due to the heterogeneity of physical machines, datacenter jobs frequently specify placement constraints, restricting them to run on a particular class of machines meeting their specific hardware (e.g., GPU) and/or software (e.g., particular kernel version) requirements. In addition, datacenter jobs have diverse demands across multiple resource types, and may saturate any type of resource, such as CPU, memory, or storage space. Despite the rich body of recent work on datacenter scheduling, it remains unclear how fair sharing is defined and achieved for jobs with placement constraints and multi-resource demands.

In this talk, I will present a new sharing policy, called Task Share Fairness (TSF), that retains several desirable fairness properties used to be provided by the existing policies for jobs with no constraint or single-resource demands. Notably, with TSF, jobs are better off sharing the datacenter than running in dedicated partitions, and are better off reporting demands and constraints truthfully than lying. Prototype implementation on a 50-node EC2 cluster has confirmed that TSF delivers its theoretically proven properties with predictable service guarantees. Additional trace-driven simulations have further revealed that TSF speeds up 60% of tasks as compared to existing fair schedulers by allocating jobs the right share of resources in the presence of constraints.

About the Speaker:

Wei Wang is an Assistant Professor in the Department of Computer Science and Engineering at the Hong Kong University of Science and Technology. His research interests cover the broad area of networked systems, with specific emphasis on big data systems, cloud computing, and computer networking in general. His recent research focuses on fundamental resource management and scheduling policies for efficient big data processing in parallel processing frameworks running in large clusters. He was a recipient of the Best Paper Finalist Award at the USENIX ICAC 2013. Before joining HKUST in 2015, he received the B.Eng. and M.Eng. degrees in 2007 and 2010 from Shanghai Jiao Tong University and the Ph.D. in 2015 from the University of Toronto, all in the Department of Electrical and Computer Engineering.