Software-hardware Co-design of Non-Volatile Memory Systems for Great Performance and Reliability

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ABSTRACT

Non-volatile memory, so-called NVM, has become one of the most important and popular elements in a computer system. For example, every smartphone has built-in storage which is usually made of flash memory. However, with different technology or material chosen for the NVM, it can present a big difference of characteristics in terms of latency, power, retention, endurance, and density. Therefore, it is not so intuitive to deploy NVMs in different computing systems for various applications. In this talk, I will introduce two key memory technologies, i.e., flash memory and persistent memory. Moreover, I will point out several challenges for the system design when these memories are adopted. In particular, I will give some design examples that jointly consider several layers including hardware and software to effectively optimize the performance for reliability and latency. With such proven design examples, I believe NVM with several distinct features can open up lots of new design opportunities for various promising applications like in-memory big data computing.

BIOGRAPHY

Dr. Chang Yu Ming is Engineering Director at Wolley since 2016 in charge of technology and product development for storage class memory (SCM) controller and key-value (KV) SSD. Prior to joining Wolley, he served as manager till 2015 in Emerging System Lab, a division of Macronix Taiwan, and technical consultant till 2012 in National Security Bureau. Dr. Chang received his Ph.D. degree in Computer Science and Information Engineering at National Taiwan University in 2015. Dr. Chang published more than 35 technical papers in global conferences including DAC, ICCAD, and ISPLED. He also submitted 40+ patent applications, and received 21 patents.

All are welcome!

In case of questions, please contact Prof Xiaohua Jia at Tel: 3442 9670, E-mail: csjia@cityu.edu.hk, or visit the CS Departmental Seminar Web at http://www.cs.cityu.edu.hk/.