Fenggang WU

CONTACT
INFORMATION

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EDUCATION

University of Minnesota, Twin Cities, MN, U.S.
Ph.D. of *Computer Science and Engineering* (GPA 3.875/4)   Sept. 2013 – Jul. 2018(expected)

Shanghai Jiao Tong University, Shanghai, China
M.S. of *Computer Science and Engineering* (GPA 3.63/4)   Sept. 2010 – Mar. 2013

TECHNICAL
SKILLS

Programming Languages
C C++ Java Python (proficient)   C# SQL Lisp MFC R Matlab (prior experience)

Open Source Software/Platform
Linux   Ceph   LevelDB   RocksDB   SPDK   libzbc

RESEARCH
INTERNSHIP

Persistent Memory Based Snapshot for File Systems (C/Linux Kernel)
Hewlett-Packard Enterprise (Fremont, CA)   May. 2016 – Aug. 2016
- Designed persistent memory based snapshot for file systems that lazily flush dirty pages to reduce the snapshot execution time.
- Implemented the file system snapshot prototype that coordinates DRAM, persistent memory, and Linux Volume Manager (LVM).
- Conducted performance evaluation of the prototype system, demonstrated that our design can significantly speed up the FS snapshot operation.

Page Fault Based Snapshot in Persistent Memory Systems (C/Linux Kernel)
Hewlett-Packard Enterprise (Andover, MA)   May. 2015 – Aug. 2015
- Designed persistent memory based snapshot for `mmap`'ed files using Copy-on-Write.
- Implemented a prototype snapshot system in `Linux kernel 4.1.0` that leverages the native Linux Copy-on-Write page fault handling.
- Characterized the system impact of our snapshot implementation on the memory load/store performance, showing that such impact is equivalent to `clflush` in terms of recover time.

PUBLICATIONS

F. Wu, Z. Fan, M.-C. Yang, B. Zhang, X. Ge, D. H.C. Du, "Performance Evaluation of Host Aware Shingled Magnetic Recording (HA-SMR) Drives", in *Transactions on Computers (TC)*, vol. 66, no. 11, pp. 1932-1945, Nov. 1 2017. [`https://goo.gl/2AQj73`]

M.-C. Yang, Y.-H. Chang, **F. Wu**, T.-W. Kuo and D. H.C. Du, "Virtual Persistent Cache: Remedy the Long Latency Behavior of Host-Aware Shingled Magnetic Recording Drives", in Proc. *ACM/IEEE ICCAD'17*, Irvine, CA, USA, Nov. 2017.

Z. Fan, **F. Wu**, D. Park, J. Diehl, D. Voigt, D. H.C. Du, "Hibachi: A Cooperative Hybrid Cache with NVRAM and DRAM for Storage Arrays", in Proc. *MSST'17*, Santa Clara, CA, May 2017. [`https://goo.gl/U3f8dh`]

F. Wu, M.-C. Yang, Z. Fan, B. Zhang, X. Ge, David H.C. Du, "Evaluating Host Aware SMR Drives", in Proc. *USENIX HotStorage'16*, Denver, CO, USA. Jun. 2016. [`https://goo.gl/oZVdrU`]

F. Wu, H. Zhu, J.-L. Lu, M.-Y Wu, "DEBUT: Delay Bounded Service Discovery in Urban Vehicular Networks", in Proc. *IEEE WCNC'13*, Shanghai, China, Apr. 2013. [`https://goo.gl/eEu5Zs`]

F. Wu, H. Zhu, J.-L. Lu, M.-Y Wu, "On Optimal Service Directory Selection in Urban Vehicular Networks", in Proc. *ACM CoNEXT Workshop on Urban Networking (UrbaNE'12)*, Nice, France, Dec. 10, 2012. [`https://goo.gl/6aX32R`]

C. Liu, J. Lu, L. Kong, **F. Wu**, Q. Wu, M.-Y. Wu, "Software-Based Green Proxy System for Wireless Networks", *Journal of Software*, 2012,23(2):215–229. [https://goo.gl/sYjYbe]

RESEARCH
EXPERIENCES

Host Aware Shingled Magnetic Recording (HA-SMR) Drive Evaluations (C, Python)
University of Minnesota, Twin Cities (Minneapolis, MN)   Sept. 2015 – Apr. 2017
- Carried out in-depth performance evaluations on HA-SMR drives with a special emphasis on the performance implications of the SMR-specific APIs.
- Proposed a novel host-controlled buffer design for storage systems using HA-SMR drives. This design separates the data management between the host and the drive, combining both of their strengths.
- Demonstrated the potential of our design by a case study in which our algorithm takes 54.5% less run time than the baseline when the I/O request size is less than 64KB.

Delay-Bounded Services in Vehicular Ad-hoc Networks (VANETs) (Python, Matlab)
Shanghai Jiao Tong University (Shanghai, China)   Sept. 2011 – Oct. 2012
- Modeled the service directory selection problem in VANETs into an optimization problem and proved its NP-Completeness.
- Designed heuristic iterative algorithm and conducted extensive trace driven simulations, and demonstrated that our algorithm can provide the same level of delay-bounded services using 20% less resources than the baseline.

Green Proxy: A Power Saving Framework for Wireless Devices (MFC, C#)
Shanghai Jiao Tong University (Shanghai, China)   Sept. 2010 – Sept. 2011
- Collaborated with team members to design a proxy framework that will make the wireless devices to hibernate for power-saving purpose while keeping the services accessible by building virtual NICs and virtual images of the devices on the proxy server.
- Implemented two use case applications – IP phone and web camera – to test the power saving and service hosting performance of the Green Proxy system.
- Demonstrated that our system can reduce over 60% of the total energy consumption.

PROJECT
EXPERIENCES

Linux ext2 File System Implementation (C)
Shanghai Jiao Tong University (Shanghai, China)   Feb. 2009 – Jun. 2009
- Built a simplified ext2 file system on top of a block device simulator.
- Implemented the functionality of super block, inode (including direct, indirect and double indirect blocks), the directory structure and dynamic data allocation.

Relational Database Management System Implementation (Java)
Shanghai Jiao Tong University (Shanghai, China)   Sept. 2009 – Dec. 2010
- Led a team to built a relational data base management system.
- Implemented the following layers: disk and file management (using file system as underlying storage, exposing block interface), memory management (buffer pool, caching), transaction management (concurrency control, recovery management), record management (interpret between disk blocks and DB records) and DB matadata management (table metadata, DB statistics, etc.).

ACADEMIC
ACTIVITIES

Peer Reviewer
IEEE Transactions on Computers (TC 2017)
ACM Transactions on Storage (TOS 2017)
IEEE Wireless Communications and Networking Conference (WCNC'12)

Volunteer
International Conference on Parallel Processing (ICPP'14)
IEEE International Parallel & Distributed Processing Symposium (*IEEE IPDPS'12*)
IEEE International Conference on Computer Communications (*IEEE INFOCOM'11*)