姜继

中科院计算所 **Mobile:** 135-010-21029 **E-mail:** jiangji.cn@gmail.com

求职意向:

软件开发工程师.

教育背景

2010–至今 **硕士学位**, 计算机系统结构, 中国科学院计算技术研究所.

2006–2010 **学士学位**, 微电子与纳电子系, 清华大学.

主要项目经历

2012/5 – 至今 **基于SSD的异构多级缓存的研究**, 职责:设计者,主要实现者.

- 针对SSD性价比高及读写性能失衡等特点,通过分析与测试多种缓存替换算法与预取算法管理异构缓存系统(DRAM与SSD)的结果与原因,提出为SSD设计缓存替换算法的原则并设计实现了新的缓存管理算法,减少SSD 的写入量同时提高命中率,有效减少执行时间.
- 负责多级异构缓存模拟器的详细设计,实现并调试缓存模拟器及多种缓存替换与预取算法(包括LRU,LIRS,MQ,Linux,AMP等),使用MSR等多种负载进行测试与分析.

2011/10 – 2012/5 **虚拟机镜像管理系统**, 职责:主要设计者,合作实现者.

- 针对虚拟化生产环境中对磁盘镜像安全性与系统稳定性的特殊需求,通过综合调研测试,在OCFS2与GFS2中选定OCFS2作为原型开发虚拟机镜像管理系统;
- 负责前期对OCFS2源代码分析调研并对性能及稳定性进行测试;负责详细设计并实现了虚拟磁盘锁以达到保护虚拟机磁盘镜像;参与设计及调试故障检测与恢复等可靠性模块的改进;关键技术包括:1)基于分布式锁管理(DLM)模块添加新锁并在关键路径进行检查. 2)重新设计高可用(Keepalive)状态机,结合磁盘心跳与网络心跳,提高故障检测效率.

2011/4 – 2011/11 **基于SSD的HDFS元数据管理**, 职责:主要设计者,主要实现者.

- 针对Hadoop中HDFS采用树型全内存结构管理文件系统元数据的不足(元数据容量受限,可扩展性差),使用哈希索引的方式实现了基于DRAM与SSD混合存储的元数据管理模块, 以略微降低峰值性能为代价大大提高系统的可扩展性,同时减少系统的故障恢复时间;
- 负责详细设计与实现元数据管理模块,关键技术包括:1)通过在内存中存储文件名指纹等方式压缩单条记录内存开销. 2)通过拼装哈希值、存储父节点号等措施减少哈希冲突,有效减少SSD读放大效应. 3)以元数据盒方式管理元数据,采用COW方式更新,保证一致性同时降低锁开销并提高SSD利用效率.

个人技能

编程 掌握Linux环境下C/C++编程,有一定Linux内核编码与调试经验,熟悉本地/分布式文件系统,有企业项目合作经验与分布式文件系统开发经验,对缓存算法有深刻理解

算法 优秀的算法与数据结构基础,熟悉HashTable、Bloomfilter等数据结构

工具 熟悉Shell编程,熟练使用GDB, Vim, Gnuplot, AWK, LaTeX, MS Office等工具

语言 通过CET4/6((600,560)/710),TOEFL(107/120),GRE(1380/1600), 具有优秀的英文阅读、交流与写作能力

主要社会活动与爱好

- 大学期间参加"清华大学爱心公益协会",曾任副会长并多次参与/组织"毕业捐衣"等公益活动
- 热衷运动,喜爱篮球、羽毛球、乒乓球、足球等并多次代表班级参加各项比赛

Jiang Ji

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Objective:

Software Developer.

Education

2010–now **Master Degree**, *Computer Architecture*, Institute of Computing Technology, Chinese Academy of Science.

2006–2010 **Bachelor Degree**, *Institute of Microelectronics* , Tsinghua University.

Experience

2012/5 – now **A study of SSD-based multi-level cache**, *Designer, main Implementor*.

- As for SSD's unique characters such as high OPS/$ and asymmetric-write, we conduct a deep analysis and experiment on different combination of cache replacement and prefetch policies and propose a new SSD-aware cache management algorithm, effectively reducing execution time
- In charge of procedure design, implement and debug cache simulator and a number of cache algorithms(LRU, LIRS, MQ, Linux, AMP, etc.), evaluate and analyse the system with several real-world workload.

2011/10 – 2012/5 **Virtual machine image management system**, *main Designer, co-implementor*.

- In order to meet a more rigid demand for virtual disk image safety and system stability, based on a thorough survey, we choose OCFS2 against GFS2 as a prototype system and develop a virtual machine image management system.
- In charge of OCFS2's source code survey and conduct a evaluation of performance and stability, design and implement a "virtual disk image lock" module to protect disk image, co-design and implement a new high availability module upon origin(including error detect, quorum, fence, etc.)
- Key points including: 1) add an additional lock based on Distributed Lock Manager(DLM) and check status on critical path. 2) re-design keep-alive state machine to combine disk heartbeat and network heartbeat in order to improve error detecting efficiency.

2011/4 – 2011/11 **SSD-based HDFS metadata management system**, *Designer, main Implementor*.

- In order to mitigate several defects of HDFS's all-in-memory tree-like metadata management architecture(such as poor scalability), we build a hash-based hybrid-storage-aware metadata management module that can improve scalability and reduce recovery time while sacrifice little peak performance.
- In charge of designing and implementing metadata management module. Key points including: 1) Store filename's fingerprint to achieve low per key memory overhead. 2) Reducing hash collision by actions like combining two hash function, storing parent ino, ect. Effectively alleviate SSD's read amplification. 3) Use a metadata-box and copy-on-write way to store metadata, guarantee file system's consistency and make a better use of SSD.

Skill

Programming	Skilled in C/C++ programming in Linux environment, familiar with and experienced in programming and debugging within Linux kernel, enterprise project experience, Deep understanding of local/distributed file system
Algorithm	Strong background of algorithm and data structure, deep understanding of HashTable、Bloomfilter, etc.
Tools	Skilled in gdb, Shell programming, Vim, Gnuplot,AWK, LaTeX, MS Office
Language	Passed CET4/6((600,560)/710),TOEFL(107/120),GRE(1380/1600), capable of oral/written communication in English

Activities

- Participated in Charity Association of Tsinghua University and acted as vice-chairman, participated/organized several times of charity activities such as "Graduation Donation"
- Fascinated in sports such as basketball, badminton, ping-pong, football, selected in class team respectively

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