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Research Interests

I like to build real stuff with some principle ideas, particularly in the fields of distributed systems, multimedia systems, and operating systems.

Education

- Ph.D. Computer Science, Huazhong University of Science and Technology, May 2009
Dissertation title: Data Dissemination for Peer-to-Peer Video-on-Demand Systems
Advisor: Dr. Hai Jin, co-advisor: Dr. Zheng Zhang
- M.S. Computer Science, Huazhong University of Science and Technology, 2005
Thesis title: Handy: A Cluster File System with High Availability
Advisor: Dr. Hai Jin
- B.S. Computer Science, Huazhong University of Science and Technology, 2002

Research Experience

- Research Intern, Mentor: Dr. Zheng Zhang, Microsoft Research Asia, July 2006-Dec. 2007
 - Trace analysis and performance improvement of the GridCast VoD system with peer assistance. We first performed a measurement study of GridCast, which has been published in IPTPS'07. After that, we examined how to improve the performance of GridCast through caching and replication.
- Research Assistant, Huazhong University of Science and Technology, July 2005-Dec. 2008
 - GridCast, a real deployed P2P Video-on-Demand system. I found and led this project since 2005. Now GridCast serves video to about 100,000 unique users and typically reaches peak loads of 400 concurrent active users in the late evening busy periods. A detailed log data collected from GridCast (about 40GB) enables us to understand and evaluate how to further improve a P2P VoD system.
 - LevaCDN, a content delivery network with inter-server sharing, which is designed to delivery large files. We examined how to manage relatively stable nodes for efficient content sharing.
- Research Assistant, Huazhong University of Science and Technology, July 2002-July. 2005
 - HANDY, a cluster file system with high availability and scalability. I found and led this project. We explored how to scale a cluster file system without its shutdown and how to provide different availability for different applications through a declarative data replication policy.
 - OMFS, a multimedia file system to manage all of videos on a cluster VoD server.
 - TCP-ABC, high availability cluster architecture with redundant TCP stacks, which masks the failure of active TCP connections between server and client, providing high availability for network services.

Selected Publications

1. **Bin Cheng**, Lex Stein, Hai Jin, Zheng Zhang, Xiaofei Liao, "GridCast: Improving Peer Sharing for P2P VoD", to appear in *ACM Transaction on Multimedia Computing, Communications and Applications*, 2008
2. **Bin Cheng**, Xuezheng Liu, Zheng Zhang, Hai Jin, Lex Stein, Xiaofei Liao, "Evaluation and Optimization of a Peer-to-Peer Video-on-Demand System", *Journal of Systems Architecture*, 2008
3. **Bin Cheng**, Lex Stein, Hai Jin, Zheng Zhang, "Towards Cinematic Internet Video-on-Demand", in *Proceedings of the 3rd European Conference on Computer Systems(Eurosys'08)*, Glasgow, Scotland, Apr.1-4, 2008
4. **Bin Cheng**, Lex Stein, Hai Jin, Zheng Zhang, "A Framework for Lazy Replication in P2P VoD", in *Proceedings of the 18th International workshop on Network and Operating Systems Support for Digital Audio and Video(NOSSDAV'08)*, Braunschweig, Germany, May 28-30, 2008
5. **Bin Cheng**, Xuezheng Liu, Zheng Zhang, Hai Jin, "A Measurement Study of a Peer-to-Peer Video-on-Demand System", in *the 6th International Workshop on Peer-to-Peer Systems (IPTPS'07)*, Bellevue, WA, USA, Feb. 26-27, 2007
6. **Bin Cheng**, Hai Jin, Xiaofei Liao, "Supporting VCR Functions in P2P VoD Services Using Ring-Assisted Overlays", in *Proceedings of the IEEE International Conference on Communications 2007 (ICC'07)*, Glasgow, Scotland, Jun. 24-28, 2007
7. **Bin Cheng**, Hai Jin, Xiaofei Liao, Zongfen Han, "Providing VoD Services Based on Unstructured Overlay", in *Proceedings of the 3rd International Conference on Semantics, Knowledge and Grid (SKG'07)*, Xi'an, China, Oct. 29-31, 2007
8. **Bin Cheng**, Hai Jin, Xiaofei Liao, "RINDY: A Ring Based Overlay Network for Peer-to-Peer Streaming", in *Proceedings of the 3rd International Conference on Ubiquitous Intelligence and Computing (UIC'06)*, Wuhan, China, Sep. 3-6, 2006
9. **Bin Cheng**, Hai Jin, Shengli Li, "ADLB: An Adaptive Scheduling for Heterogeneous Cluster Systems", *High Technology Letters*, Vol.12, Supplement, May, 2006
10. **Bin Cheng**, Hai Jin, Quan Yuan, "OMFS: An Object-Oriented Multimedia File System for Cluster Streaming Server", in *Proceedings of High Performance Computing in Asia-Pacific Region (HPCAsia'05)*, Beijing, China, Nov. 30- Dec. 3, 2005
11. **Bin Cheng**, Hai Jin, "A Novel Adaptive Distributed Load Balancing Strategy for Cluster", in *Proceedings of International Conference of Young Computer Scientist (ICYCS'05)*, Beijing, China, Sep.20-22, 2005
12. Zhiyuan Shao, Hai Jin, **Bin Cheng**, Wenbin Jiang, "ER-TCP: An Efficient TCP Fault-Tolerance Scheme for Cluster Computing", *Journal of Supercomputing*, Vol.43, No.2, Feb. 2008
13. Zhiyuan Shao, Hai Jin, Wenbin Jiang, **Bin Cheng**, "TCP-ABC: From multiple TCP Connections to Atomic Broadcasting", in *Proceedings of the IFIP International Conference on Network and Parallel Computing (NPC'05)*, Beijing, China, Nov.30-Dec.3, 2005
14. Zhiyuan Shao, Hai Jin, **Bin Cheng**, Jie Xu, "HARTs: High Availability Cluster Architecture with Redundant TCP Stacks", in *Proceedings of the International Performance, Computing, and Communications Conference (IPCCC'03)*, Phoenix, Arizona, USA, Apr. 9-11, 2003

Oral Presentations

1. "A Framework for Lazy Replication in P2P VoD", *NOSSDAV'08*, Braunschweig, Germany, May,2008
2. "Towards Cinematic Internet Video-on-Demand", *EuroSys'08*, Glasgow, U.K., Apr.,2008
3. "RINDY: A Ring Based Overlay Network for Peer-to-Peer Streaming", *UIC'06*, Wuhan, China, Sept.,2006

Pending Patents

1. Hai Jin, Feng Xian, Guang Tan, **Bin Cheng**, Zhongfen Han, Shengli Li, Liping Pang, "A Cluster-based Distributed Network Service System", No.02139288.9, Authorized Date: 15 Jun. 2005
2. Hai Jin, **Bin Cheng**, Xiaofei Liao, Doudou Zhao, Fucheng Wang, Yi Zhou, Hao Wang, Jiangpei Yin, "A Ring-assisted Overlay Network for P2P VoD", No. 200610019501.X, Applied Date: 28 Jun. 2006
3. Hai Jin, Xiaofei Liao, Wenbing Jiang, **Bin Cheng**, Fan Zhang, Yang Yu, Chong Huang, "A Cooperative Prefetching Policy for P2P VoD", No. 200810046923.5, Applied Date: 22 Feb. 2008
4. Hai Jin, Xiaofei Liao, Hao Wang, **Bin Cheng**, "An Inter-overlay Organization Method for P2P VoD", No.200610019500.5, Applied Date: 28 Jun. 2006
5. Hai Jin, Xiaofei Liao, Fucheng Wang, **Bin Cheng**, Jiangpei Yin, Doudou Zhao, Hao Wang, Yi Zhou, "A Priority-based Scheduling Scheme for P2P VoD", No.200610019525.5, Applied Date: 30 Jun. 2006
6. Hai Jin, Xiaofei Liao, Yi Zhou, **Bin Cheng**, "A Time-oriented Topology Organization Method for P2P VoD", No.200610019171.4, Applied Date: 29 May. 2006

Scientific Softwares

- **GridCast** <http://www.gridcast.cn/>
GridCast is the first internet VoD system to provide a full set of VCR operations, such as pause, forward, random seek, while using P2P to reduce server load and improve user experience. It has been live on China's national CERNET since May of 2006. In peak months, GridCast has served videos to 23,000 users.
- **HANDY** <http://grid.hust.edu.cn/handy/>
HANDY is a cluster file system built to meet the requirements of availability and dynamic in practice.

Honors and Awards

- Top 10 Graduate Students in Science of HUST
- The Science and Technology Award of National Education Ministry, 2005
- IBM China Excellent Student Award, 2003
- Excellent Graduate Award, 2002
- First Class Award of National Mathematical Modeling Competition, 2001
- First Class Award of HUST Programming Competition, 2001

References

- **Hai Jin**, hjin@hust.edu.cn
Dean of School of Computer Science and Technology
Director of Service Computing Technology and Systems
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- **Zheng Zhang**, zzhang@microsoft.com
Vice Director of Microsoft Research Asia (MSRA)
Manager of System Research Group at MSRA
- **Lex Stein**, stein@eecs.harvard.edu
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