

Hyuck Han

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JOB EXPERIENCES

Assistant Professor of Computer Science, Dongduk Women's University March 2014 - Current

Senior Engineer of Memory Solutions Lab, Samsung Semiconductor September 2012 - February 2014
Design and implementation of next-generation (FLASH/DRAM) memory solutions.

Delta Information & Commucation CO, LTD September 1999 - January 2003

- *Web Mail System* September 1999 - November 1999
Central Government Procurement Agency, South Korea
Software Developer

- *Network Management Systems* February 2000 - February 2003
The primary object of these projects is to manage backbone networks, ADSL networks and Cellular networks using SNMP and distributed objects such as CORBA and EJB.

- *Data Network Management System* February 2000 - January 2001
Hanaro Telecom, Seoul, South Korea
Software Developer

- *Redback Element Management System* February 2001 - February 2003
Hanaro Telecom, Seoul, South Korea
Primary Architect

- *ADSL Management System* May 2001 - October 2001
Korea Telecom, Seoul, South Korea
Primary Architect

- *Access Point Management System* October 2001 - February 2002
Korea Telecom Freetel, Seoul, South Korea
Primary Architect

- *SNMP Agent for Multimedia Messaging System Center* October 2002 - December 2002
Comverse, Telaviv, Israel
Primary Architect
Designed and developed a Simple Network Management Protocol(SNMP) agent for next-generation wireless communication systems

RESEARCH INTERESTS

Distributed Systems, Fault-Tolerant Systems, High-Performance Cluster Systems, Cloud Computing, Distributed Databases (Transaction Systems), Data Mining (Clustering), High Performance Storage System, Flash Storage, Memory System

EDUCATIONAL BACKGROUND

Post-doctoral Researcher, Computer Science and Engineering
Seoul National University, Seoul, South Korea March 2011 - August 2012

Ph.D., Computer Science and Engineering
Seoul National University, Seoul, South Korea February 2011
Thesis - Consolidating Remote Memory Services in Large-Scale Data Processing Systems

M.S., Computer Science and Engineering
Seoul National University, Seoul, South Korea February 2006
Thesis - High Voltage Electron Microscope (HVEM) Control System based on Grid Infrastructure

B.S., Computer Science and Engineering
Seoul National University, Seoul, South Korea August 2003

Research intern, National Institute of Informatics
Tokyo, Japan June 2010 - August 2010

- Active Caching for Approximate Similarity Search
- Design and Implementation of Greedy Method for Active Caching

TEACHING EXPERIENCE

2008 Fall System Programming (Univ. of Seoul)
2009 Fall System Programming (Univ. of Seoul)
2010 Fall Discrete Math (Hanyang Univ.)
2011 Spring Algorithms in C (Seoul National Univ.)

PROJECT EXPERIENCES

- Scalable Lock Manager in Transactional Systems* 2012 January - Current
- Performance Analysis of Transactional Systems on Modern Multi-Core Systems
 - Design, Implementation, and Evaluation of Scalable Lock Manager (mostly Latch-Free Implementation)
- Cache-as-a-Service: Accelerating IaaS by Pluggable Cache* 2010 August - 2012 August
- Design and Implementation of Disk Cache using Local/Remote Memory for Infrastructure-as-a-Service
 - Exploration of Design Spaces of our Remote-Memory-based Cache (RM-Cache) System (RM-Cache is file-system independent and pluggable.)
 - Design of Cost Model for CaaS
- Design and Implementation of a MapReduce Scheduler for Inter-Cloud* 2010 February - 2012 August
- Design and Implementation of a New MapReduce Scheduler that Supports Inter-Cloud environments
 - Design and Implementation of a HDFS-level Filter for Reducing Traffic among Hadoop Components
- Reducing Redundancy in a MapReduce Framework* 2009 May - 2009 November
- Harnessing Input Redundancy in Hadoop
 - Implementation of Cache Module for HDFS
- Algorithms for Efficient Data Management* 2007 - 2011
- Scatter-Gather-Merge : efficient star-join query processing in a MapReduce environment
 - FastSKY : efficient skyline algorithm for totally- and partially-ordered domains
 - FIR-SKY : efficient skyline algorithm for low-cardinality domains
- Shared Virtual Memory Management System for Distributed Systems* 2005 - 2006
Software Developer
- Designed and implemented a reliable remote memory system using RDMA
 - Deployed the reliable remote memory system to the virtual memory management system of Linux
 - Infiniband clusters are used to test our system
- Development of Fault-tolerant MPI over High-speed Networks* January 2005 - November 2005
Korea Institute of Science and Technology Information (KISTI), Daejeon, South Korea
Software Developer
- *SHIELD : Fault-tolerant MPI over InfiniBand* August 2005 - November 2005
 - Designed both fault-tolerant framework and MPI library running on InfiniBand cluster systems
 - This system is currently under harness test for real deployment. This project is partly supported by the KISTI Supercomputing Center which plans to build extraordinarily large cluster systems that demand strong fault-resilience property.
 - *M³ : Multiple fault-tolerant MPI over Myrinet* January 2005 - May 2005
 - Designed and implemented a core protocol for obtaining a consistent global snapshot which has a very pivotal role for fault-tolerance in MPICH-GM, which is based on RDMA communication.
 - *M³* is being used in the KISTI Supercomputing Center's Myrinet clusters.
- Development of MPICH-GF on Grids* August 2003 - February 2004
KISTI, Daejeon, South Korea
Software Developer
- Designed and developed a coordination protocol for MPICH-G2 which works on Ethernet interface.

COMPUTING SKILLS

Operating Systems

FreeBSD : System Administration

Linux : Kernel Development (Network Protocol Stack, Device Driver)

Programming Languages

C/C++, Java, GNU tools

Database

- PostgreSQL (Interface Development for Skyline Computation)
- MySQL : Implementation of Scalable Lock Manager (S2PL/Innobase), Development of (Mostly) Latch-free Serializable Snapshot Isolation (SSI/Innobase)

PUBLICATIONS

Conference

- Yongseok Son, **Hyuck Han**, Heon Y. Yeom, “Optimizing file systems for fast storage devices”, ACM SYSTOR 2015.
- Young Choon Lee, **Hyuck Han**, Albert Y. Zomaya, “On Resource Efficiency of Workflow Schedules”, ICCS 2014.
- **Hyuck Han**, SeongJae Park, Hyungsoo Jung, Alan Fekete, Uwe Roehm, Heon Y. Yeom, “Scalable Serializable Snapshot Isolation for Multicore Systems”, IEEE ICDE 2014.
- Hyungsoo Jung, **Hyuck Han**, Alan Fekete, Gernot Heiser, Heon Y. Yeom, “A Scalable Lock Manager for Multicores”, ACM SIGMOD 2013 (**selected as one of the best papers and invited to ACM Transactions on Database Systems**).
- Hyungsoo Jung, **Hyuck Han**, Alan Fekete, Uwe Roehm, Heon Y. Yeom, “Performance of Serializable Snapshot Isolation on Multicore Servers”, DASFAA 2013.
- Hyungsoo Jung, **Hyuck Han**, Alan Fekete, Uwe Roehm, “Serializable Snapshot Isolation for Replicated Databases in High-Update Scenarios”, VLDB 2011.
- Changgyoo Park, Shin-gyu Kim, **Hyuck Han**, Hyeonsang Eom, Heon Y. Yeom, “Design and Evaluation of Remote Memory Disk Cache”, IEEE Cluster 2010 (poster).
- Kyungho Jeon, **Hyuck Han**, Shing-gyu Kim, Heon Y. Yeom, Yong Woo Lee, “Large Graph Processing Based on Remote Memory System”, AHPCN 2010.
- Shingyu Kim, **Hyuck Han**, Hyungsoo Jung, Heon Y. Yeom, “Harnessing Input Redundancy in a MapReduce Framework”, ACM SAC 2010.
- **Hyuck Han**, Shingyu Kim, Hyungsoo Jung, Heon Y. Yeom, “A RESTful Approach to the Management of Cloud Infrastructure”, IEEE Cloud 2009.
- Chang Ho Yun, **Hyuck Han**, Hae Sun Jung, Heon Y. Yeom, Yong Woo Lee, “Intelligent Management of Remote Facilities through a Ubiquitous Cloud Middleware”, IEEE Cloud 2009.

- **Hyuck Han**, Hyungsoo Jung, Shingyu Kim, Heon Y. Yeom, “A Skyline Approach to the Matchmaking Web Service”, IEEE/ACM CCGrid 2009.
- Shin Gyu Kim, **Hyuck Han**, Kyungho Jeon, Hyungsoo Jung, Heon Y. Yeom, “Visualization of information flows in a very large social network”, ACM SAC 2009.
- Hyungsoo Jung, **Hyuck Han**, Shin Gyu Kim, Heon Y. Yeom, “A practical evaluation of large-memory data processing on a reliable remote memory system”, ACM SAC 2009.
- Kiyoungh Kim, Kyungho Jeon, **Hyuck Han**, Shin Gyu Kim, Hyungsoo Jung, Heon Y. Yeom, “MR-Bench: A Benchmark for MapReduce Framework”, IEEE ICPADS 2008.
- **Hyuck Han**, Hyungsoo Jung, Heon Y. Yeom, “Taste of AOP: Blending Concerns in Cluster Computing Software”, IEEE Cluster 2007.
- In Soon Cho, **Hyuck Han**, Heon Y. Yeom, O.K. Kwon, “Universal Execution of Parallel Processes: Penetrating NATs over the Grid”, ICCS 2007.
- **Hyuck Han**, Shin Gyu Kim, Hyungsoo Jung, Heon Y. Yeom, “Solving a Problem in Grid Applications : Using Aspect Oriented Programming”, ICCS 2007.
- **Hyuck Han**, Shin Gyu Kim, Hyungsoo Jung, Heon Y. Yeom, “HVEM Control System based on Grid: a Cornerstone of e-Biology”, ICCS 2007.
- **Hyuck Han**, Jai Wug Kim, Jongpil Lee, and Heon Y. Yeom, “Practical Fault-Tolerant Framework for eScience Infrastructure”, IEEE e-Science 2006.
- **Hyuck Han**, Hyungsoo Jung, Jai Wug Kim, Jongpil Lee, Youngjin Yu, Shin Gyu Kim, and Heon Y. Yeom, “SHIELD: A Fault-Tolerant MPI for an Infiniband Cluster”, HPCC 2006.
- Hyungsoo Jung, Dongin Shin, **Hyuck Han**, Jai W. Kim and Heon Y. Yeom, “Design and Implementation of Multiple Fault-Tolerant MPI over Myrinet (M^3)”, ACM/IEEE SuperComputing (SC|05) 2005.
- Hyunjoon Jung, **Hyuck Han**, Hyung Soo Jung and Heon Y. Yeom, “Dynamic and Fine-Grained Authentication and Authorization Architecture for Grid Computing”, ICCS 2005.
- Namyoon Woo, Hyungsoo Jung, Dongin Shin, **Hyuck Han**, Heon Y. Yeom, and Taesoon Park, “Performance Evaluation of Consistent Recovery Protocols using MPICH-GF”, EDCC 2005.

Journal

- Young Choon Lee, **Hyuck Han**, Albert Y. Zomaya, Mazin Yousif, “Resource-efficient workflow scheduling in clouds”, Knowledge Based Systems, May 2015.
- Hyungsoo Jung, **Hyuck Han**, Alan Fekete, Gernot Heiser, Heon Y. Yeom, “A Scalable Lock Manager for Multicores”, ACM Transactions on Database Systems (TODS), December 2014.
- Sehoon Park, Qichen Chen, **Hyuck Han**, Heon Y. Yeom, “Design and evaluation of mobile offloading system for web-centric devices”, Journal of Network and Computer Application, April 2014, (SCIE).
- **Hyuck Han**, Young Choon Lee, Woong Shin, Hyungsoo Jung, Heon Y. Yeom, Albert Y. Zomaya, “Caching in on the Cache in the Cloud”, IEEE Transactions on Parallel and Distributed Systems, August 2012 (SCI).
- Seungmi Choi, Shin-gyu Kim, **Hyuck Han**, Heon Y. Yeom, “Improving Performance of MapReduce Framework on InterCloud By Avoiding Transmission of Unnecessary Data”, ACM SIGMETRICS Performance Evaluation Review, December 2011.
- Shin-gyu Kim, Junghee Won, **Hyuck Han**, Hyeonsang Eom, Heon Y. Yeom, “Improving Hadoop Performance in Intercloud Environments”, ACM SIGMETRICS Performance Evaluation Review, December 2011.

- **Hyuck Han**, Hyungsoo Jung, Heon Y. Yeom, “Aspect-Oriented Development in Cluster Computing Software”, *Cluster Computing: the Journal of Networks, Software Tools and Applications*, December 2011 (SCIE).
- **Hyuck Han**, Hyungsoo Jung, Sooyong Kang, Heon Y. Yeom, “Performance Evaluation of a Remote Memory System with Commodity Hardware for Large-Memory Data Processing”, *Cluster Computing: the Journal of Networks, Software Tools and Applications*, December 2011 (SCIE).
- Hyungsoo Jung, **Hyuck Han**, Heon Y. Yeom, Sooyong Kang, “Athanasia: A User-Transparent and Fault-Tolerant System for Parallel Applications”, *IEEE Transactions on Parallel and Distributed Systems*, October 2011 (SCI, IF 1.8).
- **Hyuck Han**, Hyungsoo Jung, Hyeonsang Eom, Heon Y. Yeom, “Scatter-Gather-Merge: An Efficient Star-Join Query Processing Algorithm for Data-Parallel Frameworks”, *Cluster Computing: the Journal of Networks, Software Tools and Applications*, Vol. 14 No. 2, pp. 183-197, June 2011 (SCIE).
- Shingyu Kim, **Hyuck Han**, Hyungsoo Jung, Hyeonsang Eom, Heon Y. Yeom, “Improving MapReduce Performance by Exploiting Input Redundancy”, *Journal of Information Science and Engineering*, Vol. 27 No. 2, pp. 789-804, March 2011 (SCIE).
- **Hyuck Han**, Hyungsoo Jung, Hyeonsang Eom, Heon Y. Yeom, “An Efficient Skyline Framework for Matchmaking Applications”, *Journal of Network and Computer Application*, Vol. 34, Issue 1, pp. 102-115, Jan 2011 (SCIE, IF 1.1).
- Hyungsoo Jung, **Hyuck Han**, Heon Y. Yeom, Sooyong Kang, “CPS: Operating System Architecture for Efficient Network Resource Management with Control-theoretic Packet Scheduler”, *Journal of Communications and Networks*, June 2010 (SCI).
- Hyungsoo Jung, **Hyuck Han**, Heon Y. Yeom, Sooyong Kang, “A Fast and Progressive Algorithm for Skyline Queries with Totally- and Partially-Ordered Domains”, *Journal of Systems and Software*, Mar 2010 (SCIE, IF 1.2).
- Hyunjoon Jung, **Hyuck Han**, Hyungsoo Jung, Heon Y. Yeom, “Fine-grained authentication and authorisation for grid computing”, *Int. J. Critical Infrastructures*, Vol. 4, No. 3, 2008, pp 308-318.