Changyeon Jo

Staff Engineer
Samsung Electronics
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EDUCATION

Seoul National University, Seoul, South Korea
Ph.D. in Computer Science   Mar 2012 - Aug 2021
Thesis: *Remote Memory for Virtualized Environments*
Advisor: Prof. Bernhard Egger

Hanyang University, Ansan, South Korea
B.S. in Computer Science   Mar 2008 - Feb 2012
Capstone Project: *Musical Chords Generation for Given Melody using HMM*

INDUSTRY EXPERIENCES

Samsung Electronics, Hwaseong-si, South Korea   Sep 2021 - Present
Memory Software Development Team
Staff Engineer

WorldQuant, Seoul, South Korea   Jun 2019 - Aug 2019
Research Consultant

RESEARCH EXPERIENCES

ETH Systems Group, Zürich, Switzerland   Mar 2018 - Jun 2018
Visiting Ph.D. Student
Project: Adding modern x86 processor support to Barrelfish OS hypervisor.
Advisor: Prof. Timothy Roscoe

PLASSE Lab, Hanyang University, Ansan, South Korea   Jul 2010 - Jun 2011
Undergraduate Intern
Project: Survey on program analysis techniques.
Advisor: Prof. Kyoung-Goo Doh

PROJECTS

Instant Virtual Machine Live Migration   2020 - Present
Remote memory gives a unique opportunity for virtual machine (VM) live migration by eliminating the memory copy required to move a VM to another machine. We propose an optimized VM live migration technique for remote memory environments. Our technique completes a VM migration in less than 100ms for memory-intensive workloads.

Remote Memory for Virtualized Environments   2018 - 2020
Using remote memory for efficient resource utilization is rapidly getting attention with the rising popularity of high-performance network. In this project, we proposed a tailored remote memory for virtualized environments. Our system reduced remote paging latency by 41.7x at the tail and improved job execution time by 3.5x under intensive remote paging scenarios.

Machine Learning Approach to Live Migration Modeling   2015 - 2017
VM live migration is the foundation of seamless management of cloud services. However, predicting its key performance metrics is notoriously difficult due to its complex behavior. In this project, we proposed a machine learning (ML) approach to live migration modeling. With the 40,000 VM live migration data, the ML model showed 2 to 5 times better prediction accuracy than the state-of-the-art analytical model.
Project page: https://csap.snu.ac.kr/software/lmdataset

VM Checkpoint, Restoration and Live Migration Techniques 2012 - 2015
VM state management is an essential feature for optimizing user experience in virtualized environments. In this project, we proposed fast and space efficient techniques for checkpoint, restoration, and live migration. The proposed techniques reduced VM management overheads by 30% on average in the evaluation with real applications.
Project page: https://csap.snu.ac.kr/software/xencheckpointing

PUBLICATIONS   Younghyun Cho, Jiyeon Park, Florian Negele, **Changyeon Jo**, Thomas R. Gross, and Bernhard Egger. "Dopia: Online Parallelism Management for Integrated CPU/GPU Architectures." *In 27th ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming (PPoPP'22)*, April 2-6, 2022, Seoul, Republic of Korea.

Hyunik Kim, **Changyeon Jo**, and Bernhard Egger. "RapidSwap: A Hierarchical Far Memory." *Presented at the 18th International Conference on the Economics of Grids, Clouds, Systems and Services (GECON'21)*, Virtual Event, September 2021. In Lecture Notes in Computer Science (LNCS), Volume 13072, December 2021.

Daon Park, Hyeonsoo Kim, **Changyeon Jo**, and Bernhard Egger. "Can VM Live Migration Improve Job Throughput? Evidence from a Real World Cluster Trace" *Presented at the 18th International Conference on the Economics of Grids, Clouds, Systems and Services (GECON'21)*, Virtual Event, September 2021. In Lecture Notes in Computer Science (LNCS), Volume 13072, December 2021.

Changyeon Jo, Hyunik Kim, Hexiang Geng, and Bernhard Egger. "RackMem: A Tailored Caching Layer for Rack Scale Computing." *In Proceedings of the 29th International Conference on Parallel Architectures and Compilation Techniques (PACT'20)*, Virtual Event, October 2020.

Changyeon Jo, Hyunik Kim, and Bernhard Egger. "Instant Virtual Machine Live Migration." *In Proceedings of the 17th International Conference on the Economics of Grids Clouds, Systems and Services (GECON'20)*, Virtual Event, September 2020.

Youngsu Cho, **Changyeon Jo**, Hyunik Kim, and Bernhard Egger. "Towards Economical Live Migration in Data Centers." *In Proceedings of the 17th International Conference on the Economics of Grids Clouds, Systems and Services (GECON'20)*, Virtual Event, September 2020.

Changyeon Jo, Youngsu Cho, and Bernhard Egger. "A Machine Learning Approach to Live Migration Modeling." *In Proceedings of the 2017 ACM Symposium on Cloud Computing (SoCC'17)*, Santa Clara, USA, September 2017.

Changyeon Jo, Changmin Ahn, and Bernhard Egger. "A Machine Learning-based Approach to Live Migration Modeling." Presented at the *4th International Workshop on Efficient Data Center Systems (EDCS'16) co-located with ISCA'16*, Seoul, Korea, June 2016.

Bernhard Egger, Eunbyung Park, Younghyun Cho, **Changyeon Jo**, and Jaejin Lee. "Efficient Checkpointing of Live Virtual Machines." In *IEEE Transactions on Computers (TC), Volume 65, Issue 10, pp. 3041 - 3054*, January 2016.

Bernhard Egger, Erik Gustafsson, **Changyeon Jo**, and Jeongseok Son. "Efficiently restoring virtual machines." Presented at the *IFIP International Conference on Network and Parallel Computing (NPC'2013)*, Guiyang, China, September 2013, in *Springer International Journal of Parallel Programming (IJPP), Volume 43, Issue 3*, June 2015.

Changyeon Jo and Bernhard Egger. "Optimizing Live Migration for Virtual Desktop Clouds." In *Proceedings of the IEEE International Conference on Cloud Computing Technology and Science (CloudCom'2013)*, Bristol, UK, December 2013.

Changyeon Jo, Erik Gustafsson, Jeongseok Son, and Bernhard Egger. "Efficient live migration of virtual machines using shared storage." In *Proceedings of the ACM SIGPLAN/SIGOPS International Conference on Virtual Execution Environments (VEE'13)*, Houston, USA, March 2013.

Seonghun Jeong , Youngchul Cho, Daeyong Shin, **Changyeon Jo**, Yenjo Han, Soojung Ryu, Jeongwook Kim, and Bernhard Egger. "Random Test Program Generation for Reconfigurable Architectures." In *13th International Workshop on Microprocessor Test and Verification (MTV)*, Austin, USA, December 2012.

GRANTS	Young Researchers Exchange Program between Korea and Switzerland, Swiss State Secretariat for Education, Research and Innovation (SERI), 2018
	ACM SIGMOD Travel Grants, ACM Symposium on Cloud Computing, 2017

TEACHING EXPERIENCES	M1522.000800 System Programming, Seoul National University, TA	2018 Fall
	M1522.000800 System Programming, Seoul National University, TA	2017 Fall
	4190.308 Computer Architecture, Seoul National University, TA	2017 Spring
	4190.203 System Programming, Seoul National University, TA	2015 Fall
	4190.308 Computer Architecture, Seoul National University, TA	2014 Fall
	4190.203 System Programming, Seoul National University, TA	2013 Spring
	4190.203 System Programming, Seoul National University, TA	2012 Fall
	4190.203 System Programming, Seoul National University, TA	2012 Spring

PROFESSIONAL SERVICES	Artifact Evaluation Committee, *International Conference on Languages, Compilers, Tools and Theory of Embedded Systems (LCTES)*, 2019
	External Reviewer, *IEEE Transactions on Cloud Computing*, 2015

SKILLS	C, C++, Python, RDMA, Linux kernel, QEMU/KVM, Xen, Apache Spark, Pandas, Numpy, Matplotlib, Scikit-learn