Changyeon Jo

Staff Engineer
Samsung Electronics
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WORK EXPERIENCE

Samsung Electronics, Hwaseong-si, South Korea — Sep 2021 - Present
Staff Engineer
Project: Big-data analytics platform for brand SSD diagnostic data.

WorldQuant, Seoul, South Korea — Jun 2019 - Aug 2019
Research Consultant
Project: Equity price modeling and portfolio optimization.

EDUCATION

Seoul National University, Seoul, South Korea
M.S./Ph.D. Integrated Program — Mar 2012 - Aug 2021
Advisor: Prof. Bernhard Egger

Hanyang University, Ansan, South Korea
B.S. in Computer Science — Mar 2008 - Feb 2012
Thesis: *Musical Chords Generation for Given Melody using Hidden Markov Model*
Advisor: Prof. Jungsun Kim

RESEARCH EXPERIENCE

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 optimization opportunity for virtual machine (VM) live migration by avoiding the entire memory copy. In this project, we develop a new VM live migration technique for remote memory environments. Our technique completes a VM migration in 100ms regardless of the workload running in the VM.

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 propose a tailored remote memory for virtualized environments. Our system reduces remote paging latency by 41.7x at the tail and improves 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, it is notoriously difficult to predict its key performance metrics due to its complex behavior. In this project, we proposed a machine learning approach to live migration modeling. With the 40,000 VM live migration data, the trained model shows 2 to 5 times better prediction accuracy than the state-of-the-art analytical model.
Project page: https://csap.snu.ac.kr/software/lmdataset

Fast and Efficient Virtual Machine State Management 2012 - 2015
VM state management is an essential feature for optimizing user experience in virtualized environments. In this project, we proposed a fast and space-efficient state management technique for checkpoint, restoration, and live migration. In the evaluation with real applications, we reduced the management overhead by 30% on average. 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

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,
Spark, Pandas, Numpy, Matplotlib, Scikit-learn, and PyTorch