EMINE UGUR KAYNAR

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EDUCATION

Ph.D. Candidate in Computer Science

Boston University *Sep 2013 - present*
 Thesis title: "Caching Architecture for Datacenters" Gpa: 3.8/4.00
 Advisor: Orran Krieger

M.Sc. in Computer Science

State University of New York at Binghamton *Sep 2011 - August 2013*
 Thesis title: "Impact of encryption on live virtual machine migration" Gpa: 3.75/4.00
 Advisor: Ping Yang

B.Sc. in Information Systems Engineering

Bogazici University, Istanbul, Turkey (Dual Diploma Program) *Sep 2007 - May 2011*
State University of New York at Binghamton

RESEARCH INTERESTS

My research interests lie broadly in cloud computing, storage systems, distributed systems and large scale data analytics systems. Currently, my research is focused on designing and building cache architectures for big data analytics in datacenters, and evaluating the performance characteristic of coded storage systems.

PUBLICATIONS

- **E. Ugur Kaynar**, Mohammad Hossein Hajkazemi, Mania Abdi, Ata Turk, Raja R Sambasivan, Larry Rudolph, David Cohen, Peter Desnoyers, Orran Krieger,"D3N: A multi-level cache for improving big-data applications' performance in datacenters with imbalanced networks (Poster Only)", In Proceedings of the 2018 USENIX Conference on Usenix Annual Technical Conference (USENIX ATC '18), Boston, MA, USA, July 2018.

- Apoorve Mohan, Ata Turk, Ravi S Gudimetla, Sahil Tikale, Jason Hennesey, **E. Ugur Kaynar**, Gene Cooperman, Peter Desnoyers, Orran Krieger, "M2: Malleable Metal as a Service", 2018 IEEE International Conference on Cloud Engineering (IC2E), Orlando, FL, USA, April 2018.

- Jason Hennessey, Sahil Tikale, Ata Turk, **E. Ugur Kaynar**, Chris Hill, Peter Desnoyers, Orran Krieger, "HIL: Designing an Exokernel for the Data Center" In Proceedings of the Seventh ACM Symposium on Cloud Computing (SoCC '16), Santa Clara, CA, USA, October 2016.

- Ata Turk, Ravi S. Gudimetla, **E. Ugur Kaynar**, Jason Hennessey, Sahil Tikale, Peter Desnoyers, Orran Krieger, "An Experiment on Bare-Metal BigData Provisioning", In Proceedings of the 8th USENIX Conference on Hot Topics in Cloud Computing (HotCloud'16), Denver, CO, June 2016.

- Yaohui Hu, Sanket Panhale, Tianlin Li, **E. Ugur Kaynar**,, Danny Chan, Umesh Deshpande, Ping Yang, Kartik Gopalan. "Performance Analysis of Encryption in Securing the Live Migration of Virtual Machines", In Proceedings of the 2015 IEEE 8th International Conference on Cloud Computing (CLOUD '15),New York City, NY, USA, June 2015.

RESEARCH SUMMARIES

- **D3N: A multi-layer cache for improving big-data applications performance** Summer'16 - Present
  D3N is a throughput-oriented multi-layer caching architecture that mitigates network imbalances by caching data on the access side of each layer of a hierarchical network topology. The prototype of D3N, which incorporates a two-layer cache has been implemented as a modification to Red Hat Ceph Storages RADOS Gateway in the Massachusetts Open Cloud datacenter. To fully utilize bandwidth within each layer under dynamic conditions, D3N provides an algorithm that adaptively adjusts cache sizes based on observed workload patterns and congestion. D3N is highly-performant and significantly improves big-data jobs performance.

- **Erasure Coding for Performance** Summer'18 - Present
  In this project, we provide a detailed performance comparison of replication and erasure coding in a modern distributed object store deployment using a simple mathematical model and empirical analysis, and investigate the impact of storage solution characteristics (e.g. disk capacity, network bandwidth) and workloads I/O profiles (read/write ratios) on the performance. In addition, we show that a simple read cache increases the write fraction of the workload significantly, where erasure coding has an great advantage. For both approaches, we point the possible improvements which may improve the performance of redundancy solutions.

- **Bare-Metal Imaging** Fall'15 - Spring'16
  Designed and implemented The Bare Metal Imaging (BMI) service which provisions and deprovision baremetal nodes so that boundaries between clusters could be changed dynamically.

- **Impact of encryption on live Virtual Machine Migration** Fall'12 - Spring'13
  Analyzed the impact of encryption on live VM migration and compared different migration techniques (pre-copy, post-copy, demand paging...etc.) when VM migration traffic is encrypted using different encryption algorithms.

INTERNSHIP EXPERIENCE

Redhat Inc.
Research Intern June 2017 - Present

- Examine a detailed analysis of the performance comparison of the two redundancy schemes in a Red Hat CEPH object store deployment using a simple mathematical model and empirical analysis, and investigate the impact of storage solution characteristics (e.g. disk capacity, network bandwidth) and workloads I/O profiles (read/write ratios) on the performance.

- Evaluate performance of Red Hat CEPH Object Storage while simulating OSD failure and recovery and OSD node failure and recovery.

- Examine the performance of D3N cache architecture for CEPH object storage system by running diverse I/O-intensive workloads.

Index Group A.S., Turkey
Software Developer Intern Summer 2010

- Developed and maintained custom modifications to the company's ERP system. Implemented database transactions using stored procedures and took backups for disaster recovery.

Arti Technology A.S., Istanbul, Turkey
Software Developer Intern January-March 2010

- Worked as a tester in shopping chart application for Iphone, called SAF RecipeBox and mobile application titled Turkcell Goller Cepte. I designed and executed test procedures and reported incidents.

TEACHING AND MENTORING EXPERIENCE

Teaching Assistant
Department of Computer Science, Boston University

- CS 591/ EC500 Cloud Computing   Spring 2016
- CS 108 Introduction to Application Programming   Spring & Fall 2014/2015
- CS 111 Introduction to Computer Science   Summer 2015

Department of Computer Science, SUNY at Binghamton

- CS458/CS558 Introduction to Computer Security   Spring 2013
- CS 571 Programming Languages   Fall 2012

Project Mentoring
Department of Computer Science, Boston University

- CS 591/ EC500 - Cloud Computing   Spring 2019
  Ceph RGW-Prefetching: Implementation of a prefetching mechanism for the existing two level RGW read only cache.

- CS 591/ EC500 - Cloud Computing   Spring 2016
  Massachusetts Open Cloud (MOC) Monitoring Platform: Deployment of the cloud monitoring infrastructure (*Openstack Monasca+Kafka+InfluxDB+Grafana*) that collects a number of different metrics from several layers of the cloud in the MOC datacenter.

PROFESSIONAL SKILLS

- **Programming/Scripting:** C/C++, Python, Bash, Java, HTML, CSS, JSP, MySQL, LATEX.

- **Storage Systems:** Ceph, HDFS.

- **Big Data Ecosystems:** Hadoop, Spark, Hive, Pig, Zookeeper.

- **Others:** Ansible, Openstack, Monasca, Ceilometer, Kafka, InfluxDB, MongoDB, Grafana.

ACTIVITIES

Filmmaking: Member of Bogazici Cinema Club. I am interested in films and film making. I made an amateur short film called "So-called Right" in 2013.
Sports: 3 times Bronze medalist in 100m backstroke in *National Open Swimming Championship of Turkey* from 2000 to 2002. Captain of Samsun Gazi Swimming Club from 2005 to 2009.

REFERENCES

Prof. Orran Krieger	okrieg@bu.edu	http://www.bu.edu/cci/okrieg/
Prof. Peter Desnoyers	pjd@ccs.neu.edu	http://www.ccs.neu.edu/home/pjd/
Dr. Ata Turk	ataturk@bu.edu	http://ataturk.github.io/