Ali Raza

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OVERVIEW

Interests: Operating Systems, Computer Networks, Cloud Computing, Distributed Systems, Performance Analysis and Tuning
Skills: Linux Kernel Programming, eBPF, Systems and Network Programming, C, Python, Bash

WORK EXPERIENCE

Senior Engineer, HPC System Architecture **Mar. 2023 – Present**
Samsung Semiconductor Inc., USA

- Optimize operating systems to improve performance for traditional HPC and new AI/ML workloads
- Identify and analyze sources of noise in a system and devise measures to reduce that noise
- Work towards publishing the findings as research papers and code

EDUCATION

Ph.D. Computer Science **Sep. 2017 - Mar. 2023**
Boston University Boston, MA
Advisor: Prof. Orran Krieger

Unikernel Linux (UKL):

- Research on specialized Linux-based operating systems for cloud environments focusing on performance and security
- Incorporated performance-enhancing techniques like zero-copy networking, run-to-completion scheduling, etc., into Linux while maintaining its general-purpose versatility
- Implemented Unikernel Linux (UKL) and shared the patch with Linux community as an RFC
- Achieved over 10% improvement in 99th tail latency and throughput for unmodified Redis and Memcached. Further optimizations with minimal application modifications resulted in improvements exceeding 20%

Elastic Secure Datacenter:

- Enabled secure and efficient multiplexing of physical servers among multiple tenants using a hardware root of trust and a separate verification service, reducing the need for trust in the provider

M.S. Computer Science **Sep. 2014 - Jun. 2016**
Lahore University of Management Sciences (LUMS) Lahore. Pakistan

- Thesis involved context based Wi-Fi bitrate adaptation to improve throughput in mobile devices
- Designed a system that detects indoor and outdoor environments using sensors present in mobile devices, to switch between bitrate adaptation protocols

B.S. Electrical Engineering **Sep. 2008 - Jun. 2012**
Lahore University of Management Sciences (LUMS) Lahore. Pakistan

- Computer vision based final year project to reconstruct 3 dimensional models of buildings from a single satellite image, using machine learning techniques

PUBLICATIONS

- **Unikernel Linux (UKL)** - EuroSys 2023, Rome, Italy
- **Unikernels: The Next Stage of Linux's Dominance** - HotOS 2019, Bertinoro, Italy
- **Using SGX-Based Virtual Clones for IoT Security** - IEEE NCA 2018, Boston, MA
- **A Secure Cloud with Minimal Provider Trust** - HotCloud 2018, Boston, MA
- **It's All in the Name: Why Some URLs are More Vulnerable to Typosquatting** - IEEE INFOCOM 2018, Honolulu, Hawaii
- **An Anomaly Detection Fabric for Clouds Based on Collaborative VM Communities** - CCGrid 2017, Madrid, Spain