MUZAMMIL ABDUL REHMAN

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Los Angeles, CA

WORK EXPERIENCE

Edgio Los Angeles, CA June 2022 – Present
Lead Software Development Engineer Traffic Engineering Team

- Researched and rearchitected a real-time network traffic analytics system to **decrease the query response time by 40x-100x**, **increased the write performance by 30x** and **decreased the storage footprint by 11x** using similar physical servers.
- Initiated cross-organization inter-team cooperations by adding new features to shared codebases, conducting interviews, providing feedback, and maintaining analytics tools leveraged by peers.
- **Collaborated** with a skilled team to engineer a scalable, multi-tenant web service using OpenAPI specifications in Golang.
- Deployed a highly-avaliable, replicated **PostgreSQL** cluster using Kubernetes, Helm and CI pipelines.

Software Development Engineer Traffic Engineering Team

- Designed and implemented a layer-3/layer-4 **volumetric DDoS detection and mitigation** pipeline with a sub-minute response time, capable of analyzing floods of over **over 500 million packets/sec**.
- Built and maintained a data warehouse for **DNS Analytics** capable of examining **over a trillion** records.
- Decreased memory footprint for a real-time ingest pipeline by **95%**.
- Implemented a lock-free, horizontally and vertically scalable, datastream ingestor capable of transforming and ingesting **300,000 - 500,000 messages per second per server** in Golang.
- Formulated a config-driven analytics framework to identify over dozen volumetric DDoS attacks in Python.

Verizon Digital Media/Yahoo EdgeCast Los Angeles, CA August 2018 – June 2022
Software Development Engineer Traffic Engineering Team

- Decreased the response time of a near real-time system by **40%** by identifying the bottlenecks and reimplementing optimized versions of the code.
- Architected, automated, and monitored the deployments of **ClickHouse** and **Elasticserach** clusters on bare-metal servers.
- Enhanced monitoring metrics and alerting tools for the CDN load-balancers and related subsystems cutting the triage time **by upto 70%**.
- Extended an internet measurements and health-checking system to implement IP blocklisting in C++.
- Provided Tier-2 and Tier-3 support to meet SLAs as one of the service owners for load-balancers, and traffic analytics systems of the CDN.

Northeastern University Boston, MA September 2015 – August 2018
Graduate Research Assistant Networked Systems Research Group

- Developed an Internet router geolocation system which **outperforms state-of-the-art** methods by up to 15%.
- Leveraged **machine learning** classifiers with real-time measurements and Internet Registry records to predict locations of network routers with 96.5% accuracy.
- Achieved **scalability** and near **real-time response** by optimizing IP geolocations to use less than 10% of vantage points.
- Launched a **website** for geolocating Internet addresses using Python, Flask, Django ORM, MySQL and D3.js
- Deployed a public **REST API** at https://passport.ccs.neu.edu for users.
- Mentored undergraduates in principles of software development, web development and research.

EDUCATION

Northeastern University – Boston, MA September 2015 – August 2017
M.S. Computer Science CGPA: 3.63

Lahore University of Management Sciences (LUMS) – Pakistan August 2011 – June 2015
B.S Computer Science CGPA: 3.72

PERSONAL PROJECTS

- Designed a **bi-directional gRPC stream** in Golang and Docker with metrics collection using Prometheus.
- Engineered a resilient **Kafka consumer group** in Golang with asynchronous producers.
- Prototyped a **CDN** system using Amazon EC2 servers with location and DNS-based rerouting, and LRU caching.
- Implemented a **TCP/IP Stack** using raw sockets with flow control and TCP Reno congestion control in Python.
- Built a multi-user **Distributed File Sharing System** with selectable consistency guarantees between reads and writes in C++.
- Created a fault-tolerant, scalable, available **Distributed Key-Value Store** to process millions of records in C++.
- Programmed a cache-enabled, hash-based **Distributed Password Cracker** to brute force passwords.
- Developed a **firewall** to perform stateful network inspection, and filter and identify malicious packets.
- Coded Chord algorithm in a **Distributed Hash Table** for balancing the storage of files shared between peers.

ADDITIONAL EXPERIENCE AND AWARDS

Dean's Fellowship Award — Northeastern University
Awarded to admitted PhD students. — *2015 – 2016*

Dean's Honor List Award — LUMS
Awarded to students achieving academic excellence at LUMS. — *2011 – 2015*

Student Researcher — LUMS
Designed a system to secure cloud computing by eliminating sources of nondeterminism in VMs. — *2014 – 2015*

Teaching Assistant — LUMS
Teaching Assistant for a Graduate-level Computer Networks course. — *2014*

COURSEWORK

- Advanced Algorithms
- Advanced Programming in Java
- Data Structures in C++
- Data Mining & Machine Learning
- Intensive Operating Systems
- Services Oriented Computing
- Software Engineering
- Topics in Distributed Systems
- Topics in Network Security

PROGRAMMING AND DEVELOPMENT SKILLS

Languages: Python, Go, C++, C, JavaScript, Java, MySQL.
Others: Linux, Networking Protocols, Internet Measurements, Distributed Systems, Big Data Analysis, Timeseries/Realtime Analytics, ClickHouse, Elasticsearch, Kafka, gRPC, Parallel Computing, Object Oriented Programming, System Development Life Cycle, Network Loadbalancing, Nginx, Vagrant, Docker.