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-available, 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 500 million packets/sec**.
- Built and maintained a data warehouse for **DNS Analytics** capable of examining **over a trillion** records.
- Launched an DNS Reports and Analytics product for select customers to provide enhanced query information, geolocation and DDoS Identification.
- 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 **Elasticsearch** clusters on bare-metal servers.
- Enhanced monitoring metrics and alerting tools for the CDN load-balancers and related subsystems cutting the triage time **by up to 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** with **REST API** for geolocating Internet addresses using Python, Flask, Django ORM, MySQL and D3.js
- 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

- 2023 - Designed a **bi-directional gRPC stream** in Golang and Docker with metrics collection using Prometheus.
- 2023 - Engineered a resilient **Kafka consumer group** in Golang with asynchronous producers.
- 2017 - Implemented a **TCP/IP Stack** using raw sockets with flow control and congestion control, in Python.
- 2014 - Created a fault-tolerant, scalable, available **Distributed Key-Value Store** to process millions of records, in C++.

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

Publications

1. Passport: Enabling Accurate Country-Level Router Geolocation Using Inaccurate Sources
   Abdul Rehman, M., Goldberg, S., Choffnes, D.
   arXiv *– preprint arXiv:1905.04651, 2019*
2. RPC is Not Dead: Rise, Fall and the Rise of Remote Procedure Calls
   Abdul Rehman, M., Grosu, P.
   Online *– preprint Programming Models for Distributed Computing, 2017*

Programming and Development Skills

Languages: Go, Python, C, SQL, C++.
Others: Linux, ClickHouse, Elasticsearch, Kafka, gRPC, ZeroC IceStorm, Nginx, Vagrant, Docker, Kubernetes, Prometheus, PostgreSQL, Redis, CockroachDB, Saltstack, Gitlab CI, Terraform, Networking Protocols, Internet Measurements, Distributed Systems, Big Data Analytics, Network Load Balancing, High Availability, DDoS Protection, DNS.