# MUZAMMIL ABDUL REHMAN

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## 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 total query 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.
- Launched a DNS Reports and Analytics product for select customers to provide enhanced query information, geolocation and DDoS Identification.

*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, to autodetect and mitigate packet floods of **over 220 million packets/sec**.
- Built and maintained a **DNS Analytics** data warehouse storing **over a trillion** records in ClickHouse.
- 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.
- Owned and managed the load-balancers, DNS, and DDoS system of a **120 Tbps** Application Delivery Network.
- 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 pubish/subscribe pipelines, cutting the triage time **by up to 70%**.
- Mitigated data leaks in an internet measurements infrastructure by enabling selective IP blocklisting, in C++.

**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

- 2025 - Enhanced the **open-source** ClickHouse database to support conversion from UIn128 to IPv6 datatype.
- 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, in-memory **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

## 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, Terraform, Gitlab CI, Networking Protocols, Internet Measurements, Distributed Systems, Big Data Analytics, High Availability.