

# Kaustubh Rai

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## EDUCATION

### Carnegie Mellon University (CMU) | School of Computer Science

Master of Software Engineering in Scalable Systems

PA, USA | Dec. 2025

Coursework: Distributed Systems, Software Architecture, Cloud Computing, Microservice Designs, Design Patterns

Teaching Assistant: Cloud Computing

### Shiv Nadar University

Bachelor in Technology in Computer Science and Engineering

Gautam Buddha Nagar, India | May 2022

## WORK EXPERIENCE

### eParts Services LLC

PA, USA | Jun. 2025 - Aug. 2025

#### Software Development Intern

- Re-engineered Product-Pricing API (.NET, C#) for a B2B e-commerce platform serving **100k+ req/day** across multiple clients, decoupling search logic from pricing retrieval, eliminating redundant Elasticsearch queries and **cutting p95 latency by 82%** for faster and more reliable product lookups.
- Implemented targeted protection on guest-checkout endpoints to block automated cart requests by bots (**20K+ req/day**), reducing unnecessary database load and restoring full guest checkout functionality.
- Implemented version-controlled schema management for an **open-source Electronic Data Interchange (EDI) system** used by the company, by externalizing SQLite database into JSON, enabling auditability and traceability.
- Migrated legacy EDI system from Python 2 to Python 3 by porting custom grammar parsers and schema-mapping logic.

### UnitedHealth Group

Gurugram, India | Jun. 2022 - Jul. 2024

#### Software Engineer - Medicare & Retirement portals

- Spearheaded diverse projects, which included re-building a SQL-based ETL pipeline in Azure Data Factory powering a **nationwide pharmacy search (~1M req/day)**, by correcting faulty transformations which **reduced overall processing time by 73%**.
- Remodeled a synchronous location search service (Spring Boot, Java) to reactive architecture, **reducing median latency by 47%** for a platform used by **~30M+ customers annually**.
- Remediated **CVE-flagged vulnerabilities across production container images** on Azure Kubernetes Service, updating base images and dependencies to **cut high-severity security findings by ~70%** and strengthen production security posture.
- Introduced Mockito-based Java unit tests across microservices, raising test coverage from **near-zero to ~90%**.

## PROJECTS

### Telegram Web Disappearing Photos Extension (Chrome)

Dec. 2025

- Built a Chrome extension that enabled timed-disappearing (self-destructing) photos to be sent from Telegram Web by injecting custom time-to-live expiration parameters into cached client logic, allowing configurable photo lifetimes without any server-side changes.

### Distributed Bitcoin Miner

CMU | Oct. 2025

- Implemented a custom message-passing transport inspired by HTTP/3 semantics using goroutines and channels, supporting **100+ concurrent connections**.
- Built a distributed Bitcoin mining system in Go on top of this transport with Shortest Remaining Job First (SRJF) job scheduling.

### Uber Simulation Stream Processing | Teaching Assistant

CMU | Apr. 2025

- Engineered a Kafka-Samza stream processing system on AWS EMR, ingesting **~7M+ real-time driver and ride events** across 5-partitioned topics for driver matching and targeted rider ad delivery.
- Built multi-stage Samza jobs with RocksDB, integrating **~20K+ user and ~1K+ business datasets** and applying multi-factor scoring for accurate rider-advertisement match computation.

## SKILLS

**Languages:** Go, C/C++, Java, Python, C#, JavaScript

**Frameworks:** Spring Boot, .NET, Node.js, Express

**Systems & Data:** Spark, Kafka, Samza, Hadoop (HDFS, YARN), MySQL, MongoDB, Redis, Elasticsearch

**Cloud:** AWS (EMR, EC2, S3, Lambda, CloudWatch), Azure (Data Factory, Bot Service), GCP

**DevOps:** Docker, Kubernetes, Helm, Terraform, Jenkins

**Practices & Tools:** Agile (Scrum), Jira, TDD, Git, Maven, Mockito