

Osama Arshad

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Summary:

Experienced Software Engineer & Technical Lead

Skilled and adaptable full-stack engineer with extensive experience in **backend development**, **AI integration**, and **scalable system architecture**. Proven ability to design and implement robust software solutions, lead cross-functional teams, and drive innovation across the stack.

Technical Expertise:

- **Backend: Python** (Django, Flask, FastAPI, DRF), **Node.js** – building high-performance, scalable APIs using REST, GraphQL, gRPC, with emphasis on clean architecture and **TDD-based workflows**.
- **Frontend:** Proficient in React.js, Angular, Vue.js, and Next.js with Redux, Hooks, Tailwind, and Material UI—building responsive, high-performance UIs with SSR/SSG for seamless user experiences.
- **Systems & Infrastructure:** Asynchronous programming, WebSockets, microservices, monolith optimization, robust database schema design and data modeling for performance and scalability.
- **Databases:** PostgreSQL, MySQL, MongoDB, Cassandra, Redis, Vector Databases – optimized for performance and scalability.
- **Cloud & DevOps:** AWS (Lambda, S3, SQS, SNS, API Gateway, CloudWatch), Docker, Kubernetes, CI/CD pipelines.

AI & Automation:

- Hands-on experience with **LLMs**, **RAG pipelines**, **Generative AI**, and **agentic AI**.
- Integrated **LangChain**, **OpenAI**, and automation agents into enterprise-grade applications.
- Developed robust tools for web scraping (Scrapy, Selenium, proxies), and interactive dashboards using Streamlit and Tableau.
- Experienced with orchestration tools like **Twilio**, **Telnyx**, and **Vapi** for **AI-driven communication systems**.

Leadership & Collaboration:

- Led development teams in fast-paced environments, driving clean code practices and scalable architecture
- Strong advocate for innovation, collaboration, and building secure, maintainable systems

Work Experience:

Lead Software Engineer

InvoZone - April 2022 to Present

At Invozone, I build scalable backend systems using Django, Flask, FastAPI, and DRF across monolithic and microservices architectures. Skilled in APIs (REST, GraphQL, gRPC, WebSockets) and system optimization. Experienced in LLMs, RAG, Generative AI, and agentic AI with LangChain and OpenAI. Also contributed to EHR/Practice Management systems, ensuring secure workflows, patient engagement, and HIPAA compliance. Managed AWS, Docker, Kubernetes, and CI/CD pipelines for reliable cloud deployments.

Key Contributions:

- **Backend & Server Development** – Built high-performance systems using Django, Flask, FastAPI, and Node.js, with Celery and Celery Flower for task scheduling and background jobs.
- **Frontend & UI** – Experience working with React.js, Angular, and Vue.js to create responsive, dynamic, and intuitive user interfaces.
- **Microservices & WebSockets** – Developed asynchronous APIs, real-time services, and proxy servers using WebSockets, with strong focus on scalability and performance.
- **Led the design and development** - Develop scalable full-stack systems using Python, JavaScript, and Angular, implementing **Test-Driven Development (TDD)** practices to ensure quality and maintainability.
- **Automation & AI** – Developed robust business automation tools using Scrapy, Selenium, and proxies; built and integrated RAG pipelines, Generative AI models, and agentic workflows.
- **CI/CD & Cloud Services** – Implemented CI/CD pipelines using Jenkins and GitHub Actions; deployed cloud-native applications using AWS (Lambda, S3, SQS, SNS, CloudWatch, API Gateway), Docker, and Kubernetes.
- **Healthcare Systems (EHR/EMR)** – Worked on Electronic Health Record (EHR) and Practice Management Systems, ensuring secure data handling, interoperability with HL7/FHIR standards, and regulatory compliance (HIPAA/GDPR).
- **Patient Engagement Solutions** – Developed patient portals, appointment scheduling, and secure messaging modules to improve user experience.
- **Data-Driven Healthcare Insights** – Implemented analytics pipelines for real-time reporting and clinical decision support.
- **Integration Expertise** – Built API integrations with labs, pharmacies, and third-party healthcare providers to streamline clinical workflows.

▸ **Database schemas** - Designed and optimized database schemas and data models, improving data flow efficiency and query performance across microservices.

This role has strengthened my expertise in server development, intelligent automation, and cloud-native solutions, enabling delivery of efficient, scalable, and AI-powered applications.

Skills: Python (Programming Language) · Flask · FastAPI · Django REST Framework · Node.js · REST APIs · GraphQL · gRPC · Proxy Server · Microservices · WebSocket · Celery · React.js · Next.js · Angular · Vue.js · PostgreSQL · MySQL · MongoDB · Redis · Vector Databases · Jenkins · Docker · Kubernetes · Terraform · OpenAI API · LangChain · Agentic AI · RAG · Generative AI · Scrapy · Selenium · Tableau · Streamlit · pytest · unittest · EHR · HL7

Senior Software Engineer

Crown Bioscience - Remote(California, United States) June 2022 to Jan 2024

As a Full-Stack Engineer, I develop and optimize scalable web applications, transforming wireframes and user requirements into responsive, dynamic interfaces using React.js. I collaborate closely with design and product teams to integrate RESTful, GraphQL, and gRPC APIs, while leveraging AWS Serverless and containerized architectures for backend solutions. My work emphasizes performance, maintainability, and AI-powered capabilities.

Key Contributions:

- Developed responsive frontend applications using React.js, with experience across Angular and Vue.js for diverse UI requirements.
- Built and optimized AWS Serverless backend solutions using Lambda, API Gateway, and SQS, ensuring high scalability and performance.
- Ensured efficient data storage and retrieval using AWS DynamoDB and integrated Redis for caching.
- Implemented secure, scalable authentication flows with AWS Cognito and fine-grained access control.
- Enabled real-time capabilities using AWS AppSync and WebSockets for live updates and streaming features.
- Optimized analytics workflows using AWS Athena and integrated interactive dashboards via Streamlit and Tableau.
- Developed and supported backend modules focusing on **data modeling**, database schema design, and system scalability.
- Delivered well-structured, testable, and maintainable code in line with **TDD principles**.

Focused on building secure, scalable, and high-performance applications, while incorporating AI-driven workflows and cloud-native solutions to deliver seamless user experiences.

Skills: React.js · React Hooks · Context API · Angular · Vue.js · AWS Lambda · API Gateway · SQS · RESTful APIs · GraphQL · gRPC · Amazon Cognito · DynamoDB · Redis · AWS AppSync · Amazon Athena · Streamlit · Tableau · Jira

Senior Software Engineer

NewEffect - Remote(London Area, United Kingdom) Feb 2021 to Aug 2022

Worked on a fintech product, implementing advanced ML/AI algorithms and developing full-stack systems using Django for the backend and React.js for the frontend. Focused on predictive analytics using SARIMA/ARIMA models, along with modern AI techniques, to enhance forecasting accuracy and drive business intelligence.

Key Contributions:

- Developed and integrated ML/AI algorithms, including SARIMA, ARIMA, and LLM-powered models for predictive analytics and decision-making.
- Built scalable, high-performance backend systems using Django, Django REST Framework, and WebSockets for real-time event handling.
- Created responsive, interactive user interfaces using React.js, ensuring smooth and intuitive user experiences.
- Integrated third-party APIs and services to extend functionality and data enrichment across financial modules.
- Optimized both the performance and accuracy of forecasting models, improving reliability and insight generation.
- Leveraged PostgreSQL for structured data storage and Redis for performance-focused caching.

Contributed to building a robust, AI-driven fintech product with enhanced forecasting, user experience, and system scalability.

Skills: Python (Programming Language) · JavaScript · Django · Django REST Framework · REST APIs · WebSockets · Webhooks · Third-Party API Integrations · SARIMA · ARIMA · LLMs · React.js · Next.js · PostgreSQL · Redis

Senior Software Engineer

Shopdev - Dec 2020 to April 2022

At Shopdev, I contributed to building and enhancing healthcare technology solutions, particularly focused on Electronic Health Records (EHR), practice management, and patient engagement systems. My work involved developing secure, scalable backend services and collaborating with cross-functional teams to deliver solutions that improved healthcare workflows and compliance.

Key Contributions:

- **EHR Systems Development** – Contributed to the design and implementation of scalable backend services for electronic health record systems, ensuring compliance with HIPAA and healthcare data standards.
- **Backend Development** – Built and optimized RESTful APIs using Django and Django REST Framework, integrating complex data models for patient records, scheduling, and medical workflows.

- **Frontend Integration** – Supported frontend teams by developing API-driven solutions consumed by Angular and React.js applications for enhanced patient and provider experiences.
- **Interoperability** – Integrated third-party healthcare APIs (HL7, FHIR) to improve interoperability and data exchange across healthcare systems.
- **Database Management** – Managed PostgreSQL and MySQL databases, ensuring data consistency, schema optimization, and high performance for critical healthcare operations.
- **Cloud & DevOps** – Deployed applications on AWS cloud infrastructure and implemented CI/CD pipelines to ensure smooth releases and system reliability.
- **Security & Compliance** – Implemented secure authentication and access controls, ensuring patient data protection aligned with healthcare security standards.
- **Agile Practices** – Actively participated in sprint planning, daily stand-ups, and retrospectives to ensure timely delivery and continuous improvement.

Skills: Python (Programming Language) · Django · Django REST Framework · GraphQL · gRPC · Microservices · OAuth · Single Sign-On (SSO) · Redis · PostgreSQL · Cache Management · Jenkins · docker · Continuous Integration and Continuous Delivery (CI/CD) · Unit Testing · EHR Systems · HL7 · FHIR · React.js · Angular

Software Engineer

Arbisoft - July 2020 to Dec 2020

At Arbisoft, I worked extensively with Django, Django REST Framework, and React.js, contributing to the development of scalable, high-performance applications in both e-learning and distributed systems. My role focused on backend and full-stack development, database optimization, and AWS cloud integration within an Agile/SCRUM environment.

Key Contributions:

- **Backend & API Development** – Developed and optimized high-scale Django REST Framework applications, handling complex ORM logic, multi-database configurations, and asynchronous operations.
- **Learning Management Systems & Distributed Systems** – Contributed to enterprise-grade LMS platforms and scalable distributed systems, utilizing microservices architecture and real-time communication where needed.
- **Frontend Development** – Built responsive, dynamic UIs using React.js with Redux and React Hooks, ensuring seamless interaction with backend services.
- **Database Management** – Designed and optimized relational and NoSQL databases using MySQL and MongoDB, with Redis integration for caching and performance improvements.
- **Open edX** – Gained in-depth experience enhancing Open edX-based e-learning platforms, improving modularity, performance, and feature integration.
- **Cloud & DevOps** – Integrated AWS services (e.g., S3, Lambda, EC2) for scalable cloud deployments and collaborated on DevOps practices using Docker and CI/CD workflows.
- **Authentication & Security** – Implemented secure authentication mechanisms including OAuth2.0 and SSO for user management across services.

▸ **Agile Development** – Practiced SCRUM methodologies, actively participating in sprint cycles, using Git for version control and Jira for issue tracking and delivery planning.

This role deepened my expertise in scalable backend architecture, microservices, cloud-native development, and high-impact e-learning solutions.

Skills: Python (Programming Language) · Django REST Framework · React.js · React Hooks · Redux.js · Next.js · Open edX · Microservices · REST APIs · MongoDB · MySQL · Redis · AWS · OAuth2.0 · Single Sign-On (SSO) · Docker · Unit Testing · Jira

Associate Software Engineer

Convergence Business Systems - Sep 2019 to June 2020

As an Associate Software Engineer, I worked extensively with Python and frameworks like Web2Py, Web4Py, and Django REST Framework, focusing on backend development for telecom industry clients including Afghan Wireless, Telenor, and Zain (Saudi Arabia). I also contributed to a logistics product, delivering scalable backend systems and working with Linux environments for deployment and system reliability.

Key Contributions:

▸ **Telecom & VoIP Solutions** – Developed telecom-specific applications, integrating Asterisk PBX for advanced call management, VoIP capabilities, and telecom billing logic.

▸ **Dashboard Development** – Built interactive dashboards using Web2Py and Web4Py, providing real-time analytics and telecom KPI visualization.

▸ **API Development & Integrations** – Designed RESTful APIs and implemented third-party API integrations to enhance feature interoperability across distributed systems.

▸ **Agile Development** – Worked in Agile teams, actively participating in sprint planning, stand-ups, and retrospectives while delivering iterative progress.

▸ **Testing & Quality Assurance** – Developed unit and integration tests using `unittest` and `pytest`, ensuring backend reliability and regression safety.

▸ **Cloud & Deployment** – Deployed applications in Linux environments and cloud platforms, utilizing AWS services (S3, SQS), and configured CI/CD pipelines using Jenkins.

▸ **Database Management** – Managed PostgreSQL and MySQL databases with focus on schema efficiency, query optimization, and data consistency at scale.

▸ **Version Control & Project Management** – Used GitHub for version control and Jira for task tracking, promoting collaboration and traceability across the team.

▸ **Logistics Platform Development** – Built scalable, high-performance backend services using Django REST Framework and PostgreSQL, addressing logistics workflows and business automation.

This role laid a strong foundation in backend development, cloud integration, and system-level engineering for both telecom and logistics domains.

Skills: Python (Programming Language) · Django REST Framework · Web2Py · Web4Py · Asterisk PBX · REST APIs · PostgreSQL · MySQL · AWS (S3, SQS) · Jenkins · CI/CD · VoIP · Dashboarding · Linux · GitHub · Jira · Unittest · Pytest

Projects:

Crown Bioscience

<https://www.crownbio.com/>

- Initiated and spearheaded a AWS Serverless and React.js-based project, translating wireframes and user requirements into responsive and engaging web applications as a front-end engineer.
- Collaborated seamlessly with design and product teams to integrate visual elements with application functionality, ensuring a cohesive user experience.
- Engaged extensively with Python on the backend, particularly within AWS Lambdas in the AWS Serverless architecture, optimizing backend logic execution and eliminating the need for traditional server management.
- Integrated RESTful APIs and employed AWS DynamoDB for efficient data retrieval and storage in the AWS Serverless environment, contributing to streamlined data handling.
- Implemented secure user authentication using AWS Cognito, ensuring the highest level of privacy and compliance in the application.
- Enabled real-time capabilities in web applications through AWS AppSync, facilitating efficient data synchronization between front-end and backend data sources.
- Incorporated AWS Lambda functions for backend logic execution in the serverless paradigm, enhancing efficiency and reducing operational complexities.
- Contributed significantly to backend development by leveraging Python in AWS Lambdas, optimizing data analysis through AWS Athena queries.
- Played a key role in troubleshooting efforts, ensuring the seamless operation of both front-end and back-end components for a robust user experience.
- Committed to enhancing development processes by staying updated on industry best practices, incorporating feedback, and optimizing workflows for continuous improvement. Continuous commitment to development process optimization ensures that the end products not only meet but exceed user expectations.

NewEffect

- Spearheaded the development of a fintech-based Financial Forecasting and Integration Platform, with a focus on backend development.
- Leveraged Django Rest Framework to ensure a secure and efficient foundation for seamless integration with financial tools like XERO.
- Facilitated the effortless import and centralization of financial data from diverse tools on the platform.

- Applied sophisticated financial models, including the SIRIMA model, for projecting future profit and loss sheets.
- Implemented machine learning models and manual formula calculations on the backend, creating a hybrid system for optimal data-driven insights and user-defined parameters.
- Utilized Django Rest Framework to build RESTful APIs, ensuring seamless communication between the front end and the back end.
- Ensured reliability, scalability, and security of the system through extensive work on the backend. The focus on backend development ensures a reliable, scalable, and secure foundation, representing a significant stride in providing users with a sophisticated toolset for making informed business decisions.

iYurek – Real-Time Stock Trading & Analytics Platform

- Led backend architecture and engineering for a real-time stock trading and analytics SaaS platform.
- Built a serverless backend using AWS Lambda, API Gateway, DynamoDB, and S3, ensuring high scalability, low latency, and fault tolerance
- Implemented real-time data ingestion and streaming using WebSockets and AWS EventBridge for instant stock updates and KPI tracking.
- Managed data pipelines across MongoDB, Redis, and DynamoDB, optimizing for performance and reliability under high-load scenarios.
- Developed interactive dashboards with React.js, Redux, Hooks, and Tailwind, enabling live visualization of trades, market trends, and portfolio insights.
- Delivered a cloud-native system supporting thousands of live updates per second with seamless UX and precision analytics.

Claro App – On-Demand Vehicle Cleaning & Service Platform

- Led backend and admin platform development for an on-demand vehicle cleaning and service app enabling users to book, manage, and track cleaning appointments.
- Designed and built the backend architecture using Django REST Framework, implementing secure JWT/OAuth2 authentication for user and staff management.
- Developed React.js-based Admin and Super Admin dashboards for operations, support, and marketing teams to manage staff, monitor requests, and automate workflows.
- Integrated AWS services for scalable cloud deployments and connected third-party APIs for payments, SMS, and push notifications.
- Delivered a reliable, cloud-powered system that improved scheduling, optimized response times, and enhanced overall user experience and satisfaction.

SmartChat – AI-Powered Academic Support Platform

- Contributed to the development of SmartChat, an AI-driven academic platform for ALW, enhancing student engagement and reducing teacher workload.
- Built real-time chat interfaces using WebSockets and integrated AI tutoring bots for instant, curriculum-aligned learning assistance.

- Implemented secure authentication workflows to manage student-teacher interactions and ensure data privacy.
- Seamlessly connected chat and learning modules for a unified academic experience.
- Utilized Node.js, React.js, Django REST Framework, PostgreSQL, AI APIs, and AWS to deliver a scalable and reliable system.
- Achieved a 40% increase in student engagement and 60% reduction in teacher response time, improving overall educational efficiency.

ChangeMKR – Global Changemakers Platform

- Led end-to-end development of **ChangeMKR**, a global digital platform empowering changemakers to connect, learn, and launch social impact initiatives.
- Designed and built responsive web portals with interactive learning resources and challenge submission workflows.
- Developed community collaboration modules to enable peer learning, knowledge sharing, and project networking.
- Utilized React.js, Angular, Node.js/Python (Django REST Framework), PostgreSQL, and AWS for a robust, content-driven architecture.
- Engineered a scalable and secure backend infrastructure ensuring high performance and global accessibility.
- Delivered a unified platform that fostered collaboration, innovation, and social good among changemakers worldwide.

BDAutomation

- Led a significant software development initiative focused on creating a Business Development (BD) automation tool, with Python playing a pivotal role.
- Streamlined the aggregation of job postings from various online platforms, presenting them to the BD team in a structured Excel sheet.
- Overcame challenges related to managing asynchronous processes and threading, given the substantial volume of data to be scraped concurrently from multiple sources.
- Utilized threading techniques and delved into asynchronous programming for optimal performance and resource utilization.
- Implemented a rule builder to enhance flexibility, allowing the BD team to define specific criteria for job scraping.
- Developed a parser to interpret and execute rules set by the team, creating a dynamic and user-friendly interface tailored to their unique needs.
- Gained insights into project management intricacies, emphasizing the importance of clear communication within the team to align with project goals.
- Emphasized adaptability and user-centric design during the rule builder component development.

The project stands as a testament to Python's versatility in addressing complex challenges and delivering innovative solutions in business development automation.

Team AI

- Led the design and development of Team AI, an open-source Python framework that enables autonomous AI agents to collaborate on complex tasks.
- Directed the project from concept to production, overseeing both the proof of concept (POC) and the final production release.
- Built the POC with Streamlit for rapid prototyping and validation of agent coordination workflows.
- Developed a FastAPI-based backend and React.js frontend to deliver a scalable and user-friendly product architecture.
- Integrated Large Language Models (LLMs) from OpenAI and Groq, along with tools like LangChain and Copsia, to enhance agent intelligence and task orchestration.
- Designed and implemented APIs, data pipelines, and backend integrations, ensuring smooth collaboration between multiple AI agents.
- Delivered a production-ready, modular system that simulates human-like teamwork for solving multi-step, intelligent automation tasks.

Education:

Master's degree, Computer Science in Computer Science

Lahore University of Management Sciences - Lahore

October 2019 to July 2021

Skills:

