Asad Ali Amjad

SENIOR ENTERPRISE SOFTWARE ARCHITECT | EMBEDDED, BACKEND & AUTOMATION SYSTEMS

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Results-driven Enterprise Software Architect with 13+ years of experience in designing, developing, and delivering high-performance full-stack, embedded, and enterprise automation solutions. Proven track record in architecting scalable systems, solving complex technical challenges, and driving operational efficiency. Expert in C, C++, Python, Java, C#, PHP, Qt, OpenGL, Linux, Nucleus RTOS, Jenkins, and automation frameworks. Recognized for mentoring teams, implementing CI/CD pipelines, automating workflows, and delivering maintainable architectures that align with business goals.

Relevant Skills & Knowledge

System Design & Architecture: Full-stack, embedded, and middleware systems; scalable, high-performance enterprise solutions.

Embedded & Real-Time Systems: Nucleus RTOS, Linux-based embedded platforms, device drivers, multi-toolchain integration, hardware/software debugging.

Graphics & UI Development: Qt integration, OpenGL/GLSL rendering, framebuffer & hardware-accelerated pipelines, UI automation/testing.

Backend & Enterprise Automation: C++, Python/Flask services, REST APIs, data aggregation, high-availability services, automated workflows.

Testing & Observability: Test-driven development (TDD), Unit testing (Google Test, Python frameworks), automated regression testing, OpenTelemetry metrics, CI/CD pipelines, Scaptic (testing) framework.

Networking & Middleware: OpenSSL, VPN, TCP/IP, Sockets, WebSockets, multi-ACD/CX switch interfaces, enterprise middleware integration.

Process & Leadership: Scrum/Agile, sprint planning, backlog management, mentoring engineers, cross-functional collaboration, customer engagement, technical documentation.

Technical Proficiencies

Programming & Scripting: C, C++, C#, Python, Java, PHP, SQL, JavaScript (basic)
Frameworks & Libraries: OpenSSL, Qt, OpenGL/GLSL, OpenVX, Flask, Automate App, Google Test
Operating Systems & Platforms: Linux (Ubuntu, Oracle Linux), Windows, Nucleus RTOS
Databases & Messaging: MongoDB, SQL Server, Oracle, Redis, RabbitMQ
DevOps & Tools: Git/GitHub, Jenkins, Docker, GitHub Copilot, Eclipse IDE, VS Code and hardware debugging tools like J-Link, ARM D-Stream, ST-Link, Mentor Embedded debug probes

Professional Experience

Lead Software Engineer – Middleware & Switch Interfaces | Afiniti – Pakistan **Jun 2024 – Dec 2025**

- Joined as a Lead Engineer in the Shared Memory (SHM) library team, quickly understood a large C/C++ codebase, and designed and implemented the SHM Size Estimator tool improved capacity forecasting and resource efficiency for mission-critical call routing systems.
- Contributed to the High Availability team, maintaining arbiter, watchdog, and data synchronization services, resolving production issues, and implementing performance and reliability improvements.
- Owned switch interface services for multiple ACD/CX systems, primarily the Nice In-Contact switch, and maintained socket-based SDK, REST, and WebSocket integrations for AI-driven call routing.
- Supported a customer migration from one ACD to another (Nice InContact), analyzing existing API implementations and documenting the integration in **OpenAPI format** to enable the customer's development team to implement middleware efficiently.
- Implemented **PII data protection** in switch interface services, ensuring secure handling of sensitive customer data across integrations.
- Integrated **OpenTelemetry metrics** into switch interface services using an internal wrapper library, providing company-wide observability and enabling SRE teams to monitor service performance and reliability effectively.
- Expedited testing and verification of code changes using (Oracle Enterprise Linux 9) docker containers and Dev-Containers extension in VS Code.
- Eliminated chronic Linux VM instability issues on Windows laptops by investigating root causes, implementing solutions with IT, and escalating critical blockers to senior leadership, boosting engineer productivity and operational efficiency.
- Increased performance using enterprise LLMs with **GitHub Copilot** in VS Code to **rapidly deliver features, improve unit tests coverage, review code, analyse logs, debug and resolve bugs**, and leverage MCP servers to optimise AI tool usage for **improving the overall code quality.**

Principal Software Engineer – Cloud Backend | SlashNext – Lahore, Pakistan   Dec 2023 – May 2024

- Served as a Principal Software Engineer in the cloud backend team, contributing to the design, extension, and maintenance of production-grade Python backend services to detect/block URLs in enterprise emails, fortifying security posture.
- Designed and implemented RESTful APIs using Python and Flask, working closely with frontend engineers to define API contracts, payload structures, and integration workflows.
- Implemented multiple feature enhancements and backend extensions, following an established JSON schema–based validation pattern to ensure consistency, correctness, and maintainability.
- Worked extensively with backend infrastructure components including MongoDB, RabbitMQ, and Redis, contributing to data persistence, asynchronous processing, and inter-service communication.
- Diagnosed and resolved complex production issues in Python backend services through in-depth debugging and root-cause analysis, improving service stability and runtime behavior.
- Completed company-sponsored training on advanced usage of MongoDB and applied the acquired knowledge directly while working with production data models and queries.
- Entrusted with a research-focused initiative to investigate techniques for mitigating browser fingerprinting in automated web-scraping workflows.
- Built and customized open-source Chromium, and integrated Microsoft Playwright to automate browser interactions, including initial experimentation with headless execution against Cloudflare bot-detection mechanisms.

Senior Technical Lead Engineer - Middleware | Mentor Graphics – Lahore, Pakistan   Feb 2021 – Nov 2023

- Served as **Scrum Master**, optimising sprint planning, backlog grooming, stand-ups, and retrospectives, and team execution for embedded and middleware projects.
- Streamlined and accelerated **OpenSSL upgrade integration for Nucleus RTOS** by streamlining workflows, automating 90% of upgrade steps and 70% of testing, cutting release cycles from months to a single 3-week sprint.
- Executed **OpenSSL version upgrades across legacy Nucleus systems**, improving system reliability and security posture.
- Completed the development of automated Jenkins pipelines to execute OpenSSL unit tests on the Nucleus platform across QEMU, Cyclone V SoC, P1015, Sabre Lite, and UltraZed-EG, ensuring consistent build quality.
- Managed **CVE fixes** security patches across parallel Nucleus versions, interpreting RFCs, implementing fixes, and integrating into the **Scaptic framework** for uniform functional testing on multiple embedded hardware platforms, strengthening system integrity for legacy customers.

Technical Lead Engineer – Graphics & Middleware | Mentor Graphics – Lahore, Pakistan   Aug 2016 – Jan 2021

- Collaborated in **cross-functional R&D projects**, including graphics testing automation and custom demos.
- Engineered the **porting of OpenSSL** 1.1.1 to Nucleus 3.x and 4.x, enhancing system security and compatibility.
- Ported a FAT RAM Disk driver to Nucleus 4.1, mounting into Nucleus 4.1, using the parameters from Device Tree Blob (DTB) for the underlying SoC.
- Owned and enhanced Python-based **Scaptic framework** for functional testing of Nucleus networking stack; designed and implemented automated tests for new VPN features using Android clients, **adb**, and **Automate** App integration.
- Developed a streamlined, repeatable process for **Qt open-source upgrades integration into Nucleus RTOS**, slashing manual completion time from months to weeks and significantly **improving system reliability through automation**.
- Investigated and implemented unit testing frameworks for Qt applications and OpenVX 2017 API, as well as testing of safety-critical graphics rendering systems.
- Fixed bugs in an **Eclipse plugin using Java**, contributing to improved IDE stability.
- Hands-on hardware/software debugging devices, like J-Link, ARM D-Stream, ST-Link, Mentor Embedded probes, and Eclipse IDE.

Senior Software Development Engineer – Graphics | Mentor Graphics – Lahore, Pakistan   Oct 2014 – Jul 2016

- Integrated **Qt open-source with Nucleus RTOS**, providing framebuffer-based and OpenGL-based rendering options while handling POSIX and non-POSIX configurations for maximum compatibility.
- Devised high-fidelity **OpenGL/GLSL demos** , enabling performance benchmarking of Qt with GPU on Nucleus RTOS.
- Transformed application performance through strategic optimisation of Qt C++ widgets on Nucleus RTOS, achieving measurable improvements in efficiency, reliability, and overall user experience for medical devices, earning the "**Best Technical Support**" award for outstanding technical delivery.
- Designed a fully functional industrial tank automation demo, illustrating adjusted control workflows and system reliability.

Software Developer – Control Systems / Robotics | AEDesign – Lahore, Pakistan   Aug 2013 – Oct 2014

Product: AVCASS Mini Robot / TS-7800 Embedded Linux C++ Application / Windows C# Application

- Augmented robotic linear motion by developing a C++ application with an integrated PID control system.

- ⊕ Engineered network communication modules, enabling real-time control of the robot via TCP/IP and UDP/IP.
- ⊕ Delivered a hybrid control Application (C#) for Windows, facilitating rapid communication with the robot while maintaining precise control and reliable autonomous navigation.

Business Applications Executive | Metro Cash and Carry – Lahore, Pakistan   **Mar 2013 – Aug 2013**

- ⊕ Automated a frequently requested report by designing **SQL Server aggregation tables** integrated into nightly synchronization processes, reducing a 15-minute 300-line query to a 30-second 15-line query, using C# and ASP.NET.
- ⊕ Collaborated with local management teams to translate reporting requirements into **optimized data structures** that improved query performance and data accessibility.
- ⊕ Improved local MIS system efficiency by minimizing complex JOINs in the SQL queries and leveraging pre-aggregated data, enabling faster decision-making and reporting for store-level operations.

Software Engineer | Xelleration - Lahore, Pakistan   **Jun 2012 – Feb 2013**

- ⊕ Delivered a ready-to-use shopping-cart web part for rapid enablement of e-commerce in Microsoft SharePoint sites, using C# and ASP.NET. Used CAML and LINQ to query SharePoint lists data efficiently.

*Additional Experience as **Graduate Teaching Assistant (Aug 2011 – Jan 2012) at LUMS** – Lahore, Pakistan*
Additional Early Experience / Projects

- *Developed web applications in PHP using CodeIgniter framework during undergraduate studies.*
- *Completed extensive academic projects in Java, including object-oriented design and multi-threaded applications.*
- *Completed extensive academic projects in embedded C on different MCU platforms like Atmel, Microchip, etc. and Verilog projects on FPGA kits.*

Education

Bachelor of Science (Honours) in Computer Engineering | LUMS – Lahore, Pakistan   Jun 2011