

Aalok Shah

(+91) 9510155120
aalokshah2016@gmail.com
linkedin.com/in/shahaalok
github.com/aalokshah-git
slideshare.net/alokshah1990/



Solutions-driven and self-motivated professional having 3 years of experience in managing embedded software developments, and 12 years of experience working over cutting edge tools and technologies (in Networking, Storage, IOT, IIOT), looking for a good contributing position.

Versatile experience in owning the modules, delivering the projects, and leading the small teams across all phases of software development lifecycle in Kernel-space, User-space, BareMetal, and Library developments.

Team player having good interpersonal communication skills to collaborate with customers, cross-functional teams and other stakeholders while working at different geographical locations.

Tools and Technologies

Programming Languages: C, C++ (Intermediate), Python (Basic)

Programming Skills: Data structures, Inter-Process Communication, Multi-threaded Application, Reusable Library Development, OS Internals, Opensource Development, STL and Design Patterns (Basic), Interrupt Handling, Socket Programming, Low Power and Low Memory Design, Debugging Tactics

AI Tools: Various AI Agents and Models, GitHub CoPilot, Office365 CoPilot

Networking Knowledge: Telemetry, Dataplane Programming, SDN, OpenFlow, P4, SAI, Network Offloads, ARP, NAT, VLAN, ACLs, QoS, STP, VxLan, LAG, Subnetting, TCP, UDP, Mirroring, MAC Learning

Storage Security Knowledge: SPDM, TIM, eHSM

Tools and Utilities: Visual Studio, VIM, GDB, CScope, BusyBox, Buildroot

Communication Interfaces: PCIe (DMA), UART (RS232/485), SPI, I2C, ADC, LCD

Version Control: GIT, Gerrit, SVN, Perforce

Code Quality: Coverity, CPP Checker, Astyle, Valgrind, Doxygen, MISRA Guidelines

Bug Tracking and Task Management: MS Planner, JIRA, Trello

QA and Documentation: Jenkins, Plant UML, Microsoft Visio, TestLink, Confluence, Automation Test-suites

Hardware Related: Schematic Reading, Multimeter, Oscilloscope, Spectrum Analyzer

Boot loader: U-boot

RTOS: Zephyr (Basic), FreeRTOS, MQX (PowerPC)

Wireless Technologies: BLE Mesh, Zigbee Mesh, Smart Mesh, Wifi Mesh, Linux Shell Commands (OpenWrt)

Windows Driver: NetAdapterCx, NDIS, UMDF, WHQL Process

Education

Bachelor of Engineering – Electronics and Communication

Gujarat Technological University, 2012

CGPA: 8.8/10

Experience

Marvell Semiconductor

Senior Manager (04/24 – Current)

- Oversaw the complete SDLC of Marvell's SIP's Library: requirement and analysis -> architecture and planning -> design and development -> QA and lab deployments.
- Managing and contributing to design of PRD and Product PPT Decks for SPDM and making sure to make sure for customer requirement discussions and delivery timelines.
- Collaborating with Architecture, Hardware, QA, Manufacturing, Compliance, Liquid Security, Documentation. Tools and Marketing teams.
- Leading the team of four engineers while making sure their periodic reviews and performances.
- Responsible for defining and managing sprint plans, release process, customer document book, lab management and development practices.
- Travelling to domestic Marvell sites for collaboration and presentation purpose.
- Participant of SPDM DMTF community to contribute with protocol enhancement aspects.

Marvell Semiconductor

Senior Staff Engineer (08/20 – 03/24)

- Development and release management of NetAdapterCx based miniport driver written for [Marvell's FastlinQ Ethernet Edge Controllers](#).
- Working in collaboration to FAE and QA team for managing the features and customer requirements in miniport driver written for FastLinQ Edge controllers, and Marvell's security library.
- Bug Fixing and enhancements over NDIS based windows miniport driver and windows bus driver written for [Marvell's FastlinQ Ethernet Server Controllers](#).
- Participant of Windows DPDK community to add the support for FastLinQ Server controllers.

Vadict Innovations Pvt Ltd

Embedded Firmware Lead (02/19 – 06/20)

- Established embedded firmware team in the startup from zero to the team of five engineers, and directed firmware execution for the pilot project (first of its kind in India) towards IIOT.
- Experienced complete PDLC cycle: ideation -> requirements analysis -> feasibility/POC -> design and development -> production and QA -> support and maintenance.
- Defined and oversaw firmware development strategies (code quality, reviews, release management), and organized execution processes related to training, periodic assessment, and on boarding.
- Worked closely with HR while on boarding the team, organizing Hackathon for college students, and preparing marketing collateral for a business event.
- Could be one of the few teams in the world to put efforts towards establishing wireless connectivity inside the hazardous close-roof oil tank (zone-0) and inside the ground pits at industrial sites.

Volansys Technologies

Sr. Embedded Engineer (07/14 – 02/19)

- Successfully demonstrated working on multiple projects in parallel, being accountable for the delivery from the team of five engineers at one time.
- Front-line communicator with the customer for requirement analysis and design discussions.
- Notable achievement of a teamwork – customer account was influenced from 9 people team to the 40 people team (biggest in company) over the span of 1.5 years.
- Worked with managers as subject matter expert for identifying business opportunities, improvising development processes, and preparing on boarding trainings.
- Initiated technical and soft-skill development training programs across the company with colleagues.
- Voluntarily contributed in BizDev for a month, aligning sales presentations of multiple business decks.

- Mentored the Marwadi University students on IOT during their industrial visit at the company.
- Multiple visits to universities as a member of interview panel during fresh hires.

Relcon Systems

Embedded Engineer (10/12 – 07/14)

- Appointed to visit East Africa for deployment of the project in the initial six months of job.
- Owned the design, development and testing of the Bare metal firmware and RTOS application.
- Involved in schematic designing, production and shipping along with firmware development.

Rewards

- “Certificate of Recognition” from Marvell, for technology showcase in Marvell’s Connect Event, 2023
- Silver Level (4 Star Badge) and Problem Solving (Basic) certification from HackerRank
- Multiple “Certificate of Appreciation” from Volansys, for performing at company’s core values.

Projects

SPDM Security Library for Storage & Fiber Channel Products

Marvell’s IP (02/23 -)

- Worked with team for modularized architecture of Security Library keeping reusability and reliability in mind for its integration with multiple Marvell’s SOC product lines.
- Led SDLC efforts to integrate library with Marvell’s FC Controller product line.
- Active contribution in development, test and bug fixing of library modules related device measurement management, SPDM protocol handshaking, and more.
- Prepared design for key enhancements which includes multiple connection support, hashing in parts support, memory and storage requirements, and more.
- Worked with IT and Manufacturing team for designing and implementing the manufacturing automation flow which includes OTP provisioning and certificate store generation.
- Designed and implemented CPP skeleton structure of Management Firmware for easy integration to SPDM and other libraries.
- Added support for MPU covering protection for 4 GB space in Management Firmware.
- Architected and worked with Liquid Security, Compliance, Tools and Release team for designing and implementing infrastructure (which accesses HSM and Database) for CoRIM (needed for SPDM), PKI (needed for CA Certificate Signing), and OTP (needed for provisioning devices at Manufacturing).
- Designed light-weight Memory based Tracing Framework and its GUI application parser to analyze context switch points of Zephyr, Threads and ISRs, which has helped to mask the issue lingering in firmware for two months.

Windows Drivers for SmartNic Ethernet Controllers

Marvell’s IP (08/20 – 01/23)

- Ported NDIS based FastLinQ Edge driver to NetAdapterCx (newly introduced KMDF driver development framework) with all required support (Network Offloads, RSS, RSC, Event Notifications, QoS, WPP, etc.)
- Release management and WHQL certification of FastLinQ Edge miniport driver for customers and Windows10 21H1 updates.
- Bug-fixing and enhancements over miniport and bus drivers written for FastLinQ Server (Specifically towards L2 Datapath, SRIOV, Surprise Removal, NDIS Controlpath)
- Added support for PacketMon in the driver.

IIOT Smart Sensors (Earthpit, ESA, FRVT)

Vadict's IP (02/19 – 06/20)

- Designed the communication protocol, firmware architecture, and computing algorithm for each sensor use case, and oversaw development and testing of the same.
- Fulfilled the need of Network Engineer by architecting and configuring (subnetting, VLANs, routing, firewall) the networking infrastructure at sites consist of switches, gateway, firewall, Ubiquity Wi-Fi mesh and AirMax technologies.
- Tested and analyzed wireless technologies (BLE Mesh, Zigbee Mesh, SmartMesh, and Wi-Fi Mesh) for their performance (RSSI, Packet Loss, Network Challenges, and Troubleshooting) in IIOT use cases.
- Engineered the deployment of routers at the site to cover up the 1.8km² area, where sensor nodes can communicate to central coordinator over Zigbee Mesh.
- Implemented automation script which plots data of FFT and firmware filters over the RAW ADC data captured at site, which has added a value in trend finding.

Network Telemetry Solution

Cavium Inc, Volansys's IP (12/17 – 10/18)

- Introduced **INT (Inband Network Telemetry)**, POC support in the programmable SDN switch,
 - Forwarding plane programming in XPC (proprietary language) to perform INT header processing, metadata handling as per [RFC](#), and performing table lookups.
 - Table memory creation and handling in SRAM, to make the INT metadata available in forwarding engines from control plane.
 - Facilitating support in forwarding and control plane for concepts of Source, Sink and Intermediate node of the INT.
 - Support in parser to identify availability of INT header over VxLan GPE.
 - CLI interface design to manage INT support.
- Led development of **Telemetry Agent Library**:
 - Supported features – In-band Network Telemetry (INT), Microburst Detection, Elephant vs Mice Flow, Packet Exception Handling, Path Latencies, Statistics and Utilization (Queue, Buffer, Table)
 - Architected portable and open-source API design, and led implementation, QA, and deployment of the same across multiple releases.
 - Communication between Telemetry Agent and Telemetry Cloud over MQTT and HTTP.

Wi-Fi Mesh Home Routers

First Alert (11/18 – 02/19)

- Improved the commissioning time of routers (comes during configuring the network at first time) from ~3.5 minutes to ~30 seconds which requires handshaking with cloud and mobile application.
- Worked over WLAN commands available in Linux, bug-fixing within the scripts written over OpenWrt.

SDK Development for SDN SOC

Cavium Inc (12/14 – 02/18)

- Managing implementation of Packet Driver and Interrupt Manager modules in user and kernel space,
 - DMA communication including memory management for multi-queue and multi-packet support
 - Support of performance troubleshooting and counter statistics (ProcFs, CLI).
 - Optimizing the driver to achieve better throughput (implemented software descriptor-chains).
 - Interrupt handling design to tackle against all the nested categories supported in ASIC.
 - IPC communication used to achieve the design - RT Signal, Netlink, Shared Memory.
 - Design patterns used in the design – factory, singleton, abstract factory.
- Development of 32bit granular SCPU (MIPSK) firmware running in SRAM for handling independent activities of the switch.
- Bug-fixing, enhancements and debugging across various modules of user-space and kernel-space, reported through networking test-suites (failures of L2/L3/L4 testcases) or Valgrind or Coverity.

- Involved in making of Code Auto Generation Tool with Python, later it became IP of the company.
- Involved in making of Automation Test Framework in Python.
- Ostinato (Open-source traffic generator) integration with SDK for running diagnostics (like Snake Test) with legacy ASIC variants, and prepared demonstrative videos for the team.
- Contributed to implementing the glue (wrapper) layer for integration of SAI headers with SDK .
- Contributed to feature layer implementation for FDB Aging, Timestamp insertions for PTP.
- Contribution in link manager - configuration related to Port, Mac, Serdes, SKUs.

Instrumented Top Drive Drill Sub

FinishLinePDS (10/14 – 12/14)

- Designed low power firmware in vertical layered architecture which gathers monitoring data from around 40 different kinds of sensors, and sends it over half/full duplex RF communication (CC2520).
- Written interrupt-based drivers for UART, RTC, ADC, and polling-based drivers for SPI, I2C, Watchdog from scratch over AVR and PIC controllers.
- Socket programming over Ethernet interface.

Serial to Wi-Fi Interface in IoT Library

Arrayent (8/14 – 9/14)

- Design and implementation of serial CLI of ACM series written over VxWorks which interprets command sent over serial and perform WLAN operation (Similar to AT series commands of GSM/GPRS).
- OTA upgrade and logging support over HTTP with IoT cloud.

Forecourt Control System

Relcon's IP (10/12 – 07/14)

- Written firmware following MISRA guidelines on Cypress controller, which takes data over RS232/RS485, buffer them in NVRAM, and send it over powerline communication.
- Developed multi-threaded application over MQX (Freescale RTOS), protecting shared access to NOR.
- Written interrupt-based communication drivers in Assembly Language for UART, Timer and I2C.
- Designed and implemented protocol of communication between companies' two IP.
- Implemented applications over Socket programming and Modbus communication.

References would be given on request.