Nabendu Bikash Maiti

Senior Embedded System Arch/Lead | IoT Secure Design | 18+ Years' Expertise

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Senior Embedded System Lead with over 18 years of experience in designing, developing, and leading secure IoT and embedded system projects. Proven expertise in delivering scalable, high-performance solutions, leading cross-functional teams, and driving innovation in firmware, security protocols, and containerized environments. Proficient in Linux, VxWorks, Zephyr, Kubernetes, Docker, and full-stack development, with a strong focus on agile leadership and strategic problem-solving.

PROFICIENCY

- Technical Leadership: Directed global teams in architecting secure IoT systems, BSPs, and drivers for multi-core platforms, ensuring timely delivery and superior quality.
- System Design Expertise: Crafted robust firmware and software architecture for Linux, VxWorks, Zephyr and FreeRTOS, optimizing performance, security, and scalability.
- Security Implementation: Spearheaded ECDSA, AES, and SGX protocol integration, specializing in vulnerability analysis, fuzzing, and secure onboarding.
- Agile Project Management: Streamlined agile workflows, CI/CD pipelines, and DevOps integration, cutting development cycles by up to 70%.
- Mentorship and Collaboration Guided engineers promoted cross-functional collaboration and aligned technical solutions with business goals.
- Innovation and Prototyping: Delivered POCs for ML-based fuzzing, KVM deployments, voice-controlled automation, and full-stack applications, demonstrating technical versatility.
- Patent and white papers: Secured Intel secret status for an idea and published internal white papers to enhance team and management technical knowledge.

PROFESSIONAL EXPERIENCE

Senior Software Engineer, Intel, Bangalore, India

Jan 2025 – Present Led Zephyr-based firmware design, development for Intel-ARC GPU, focusing on secure MCTP/PLDM stacks and tooling frameworks.

- Spearheaded design and implementation of in-band and out-of-band MCTP stacks, enabling robust monitor control and PLDM integration using zephyr on cortex-M4.
- Reduced debug cycles by enabling vscode JTAG-based debugging workflows.
- Developed CI-integrated automation, testing and release frameworks, achieving a 70% reduction in development time.
- Created a vscode based development environment, enhancing productivity for 15+ developers and testers.
- Provided strategic recommendations for LED drivers, PLDM, and FRU, ensuring compliance with industry standards.

Senior Software Engineer (Provisioning), Intel, Bangalore, India

May 2023 – Dec 2024 Extensively worked Kubernetes-based OS provisioning using Tinkerbell for enterprise-grade device onboarding.

- Designed and developed Libvirt KVM-based bare-metal provisioning to reduce development cycle (reduction 70%), customer deployment cycle, KPIs and huge scalability testing.
- Optimized OS performance by 70%, enhancing system reliability and efficiency.
- Implemented TPM2-based FIDO secure onboarding, ensuring zero-trust security.
- Streamlined Tinkerbell workflows on Kubernetes clusters, reducing provisioning time by 50%.

- Developed a full-stack POC with React frontend and Golang backend, demonstrating end-to-end provisioning capabilities.

Senior Security Software Engineer, Intel, Bangalore, India

June 2017 – April 2023 Led security initiatives for embedded systems, focusing on vulnerability mitigation and secure boot protocols.

- Designed SGX enablement for Slimbootloader, enhancing platform security for Intel products.
- Participated in Whitehat hacking and fuzzing (Restlier API, AFL++), uncovering critical vulnerabilities and improving product resilience.
- Led secure device onboarding protocol development, managing agile sprints for a 10-member team.
- Implemented low-level ECDSA and AES protocols for Linux and FreeRTOS, optimizing memory and performance.
- Pioneered ML-based fuzzing POCs, reducing security testing time by 40%.

Graphics Software Engineer, Intel, Bangalore, India

January 2014 – May 2017 Contributed to i915 Linux display driver development, focusing on NV12 and hardware scaling.

- Developed NV12 driver and scaling solutions, improved display performance.
- Mentored a team of 5 engineers, fostering technical growth and upstreaming kernel patches.
- Collaborated with open-source communities to integrate patches, enhancing driver compatibility.

Software Engineer II, Broadcom, Bangalore, India

February 2013 – November 2013 Contributed to 4G modem firmware optimization.

- Optimized power consumption by 25% across power planes through profiling and enhancements.
- Enhanced firmware stability with targeted bug fixes and stack optimizations.

Senior Software Engineer, Concurrent Technology, Bangalore, India

August 2011 – February 2013 Led platform team in developing BSPs and drivers for Linux and VxWorks.

- Designed and validated VxWorks BSPs for CPCI, VME, and VPX boards, ensuring real-time performance.
- Developed FreeRTOS based diagnostic suites, improving system reliability by 20%.
- Created PCH-based Ethernet GEI drivers, enabling high-speed connectivity.

Senior Software Engineer, Applied Micro, Pune, India

July 2010 – August 2010 Led BSP and driver development for multi-core SoCs in pre- and post-silicon phases.

- Developed multi-processor DMA and SDHC v3 drivers, supporting high-throughput applications.
- Led SMP and AMP BSP development, ensuring scalability across multi-core environments.
- Ported Ethernet packet classification IP driver, enhancing network performance.

Software Engineer, Igate Patni Computers, Mumbai, India

September 2006 – July 2010 Directed end-to-end embedded software projects, from requirements to deployment.

- Managed projects from requirements to deployment, ensuring timely delivery and gathering customer requirements on-site in Japan.
- Designed and developed VxWorks drivers, image processing APIs, Bmp decoder/encoder, YUV converter, and SD driver for graphics processors on VxWorks.
- Architected software and built frame buffer drivers for Discrete Graphics Processor boards with embedded GUI support, and evaluated DirectFB on SM501 graphics controller.
- Developed and tested Linux drivers for Frame Grabber PCI boards, RTC drivers with Firewire OHCI focus, and ported/debugged Linux/VxWorks on Coldfire M5475 for stability.
- Led VxWorks BSP, bootloader, and U-Boot porting for Freescale SoC, and designed context switching for PIC32 on MpLab XMK Scheduler.
- Developed testing strategies for reliable I/O module delivery.

Software Engineer, ABB, Faridabad, India

September 2005 – February 2006 Designed automation solutions for industrial control systems.

- Programmed ABB BRC controllers and IO modules for power plant automation.
- Resolved critical customer issues through on-site factory engagements.

EDUCATION

P.G. Diploma in Embedded Systems CDAC, Kolkata
Achieved 82% score, specializing in real-time systems and firmware development.

B.Tech. in Applied Electronics and Instrumentation Engineering Heritage Institute of Technology, Kolkata
CGPA: 8.35, with focus on embedded systems and control engineering.

CERTIFICATIONS & TRAININGS

Professional Trainings

- Linux Device Driver Development, Comptrix Systems Pvt. Ltd., Pune.
- MATLAB Image Processing and Robotics, TRI, IIT Mumbai.
- Industrial Automation and PLC Programming, Center of Electronics Test Engineers.
- Training on Embedded system (8051 and PIC programming) and PLC Programming (Ladder Logic Siemens S5) from Center of Electronics Test Engineers.

Certifications

Alexa Skill Development, Node.js & React.js, AI Foundations: Machine Learning, Cryptography & Network Security, Python advanced & Parallel Programming, Docker & Kubernetes: Advanced, LLD, HLD System Design (Udemy, Lynda.com, LinkedIn Learning)

OTHER PROJECTS

Full Stack MERN Stock GUI: Developed a real-time stock alert platform using ReactJS, Golang, and Python, integrating REST APIs and WebSocket for live updates.
Secure IoT Home Automation: Designed a voice-controlled automation system using CMU Sphinx, Google Cloud, and OpenWrt, with RT5350 and ESP8266 for secure connectivity.
Python Telegram Bot: Created an interactive multi-user bot with scalable backend architecture.
Autonomous Robotic Vehicle: Led design and implementation using OrCAD, DirectX9, and embedded control systems.
Low-cost PLC (IELAC): Developed an intelligent logic controller using Eagle, Proteus, and PIC programming.
AVR USB HID GPIO: Designed an AVR-based USB I/O board for custom embedded applications.

SKILLS & OTHER

Languages: C, C++, Assembly, Python, Golang, NodeJS, JavaScript, html, shell script
Operating Systems: Linux, Zephyr, VxWorks 6.x (RTOS), XMK (RTOS), OpenWrt, FreeRTOS, MbedOS
Development Tools: GCC, Diab, MpLab, KEIL, GDB-KGDB, WDB, Arduino, DSTREAM, TRACE32, ICE, BDI
Containerization and Orchestration: Docker, compose, Kubernetes – k3d, rk2
Tools: JTAG, Logic Analyzer, Power-PC, ARM (cortex M/A), x86, RT5350, ESP8266, 808x, 8051, PIC, AVR, UART, PCI(e), SD, SPI, I2C, Modbus, Firewire, servo motors, PIR sensors, WIFI
Schematic &PCB design: Eagle, Porteous for simulation
Others: Embedded Systems, Dockers, AWS Beanstalk, IOT, Machine Learning, Natural Language processing, ReactJS Framework, Webapp, System Programming, Perforce, CVS, GIT, JIRA, Bugzilla, Industrial Automation, IOT clouds, [3D CAD] Fusion360, Raspberry-PI