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Sr. Embedded & System Lead Developer
Ensuring Secure IOT System Design

Over 15+ years of demonstrated expertise in Design, Development and Validation of Embedded Systems and system programming

CORE SKILLS TAGS
• Security & cryptography
• Linux, RTOS, Android
• Boot loaders, BSP, OS Kernel, Device Drivers
• Display, Graphics Camera Driver
• On chip & Kernel Debugging
• Docker
• **Power M**anagement
• Firmware
• IOT system design & deployment
• Open source software
• NLP & ML
• Industrial Automation

Summary

- Well versed with security software design and implementation.
- Embedded System Design professional with solid experience in analysis, Architecture design, development, integration and validation of embedded software.
- Familiar and worked under agile methodology.
- Guiding & Leading team members on technical issues.
- Extensive Expertise on full stack graphics and camera drivers.
- Exposure in managing multi core system software development projects in offshore/onshore locations.
- Technically competent with expertise in development of BSP, Device Drivers on Linux OS, VxWorks and other RTOSs.
- Detail-oriented, with good analytical skills.

TECHNICAL PROFICIENCY

Languages   : C, C++, Assembly, Python, NodeJs, JavaScript, html, shell script, TCL
Operating Systems : Linux, VxWorks 6.4- 6.9 (RTOS), XMK (RTOS), Openwrt, FreeRTOS, MbedOS
Development Tools : GCC, Diab, MpLab, KEIL, GDB-KGDB, WDB, Arduino, DSTREAM, TRACE32, ICE, BDI,
Hardware & IPs   : 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, Proteous 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, RasberryPi

PROFESSIONAL EXPERIENCE AND ACCOMPLISHEMENTS

INTEL, BANGALORE	Jan 2014 - Date

Sr. Software Engineer
Project: SGX enabling on new IOT server platform.
Technology: C, EDK II, UEFI, slimbooatloader, rally   Team Size: 4
Role:
- Fuzzing using AFL, Restlier API fuzzing
- Design of sgx implementation
- Implementation of sgx enabling flow

Sr. SW/Security Lead Engineer
Project: IOT device secure onboarding.
Technology: C, Linux, yocto, mbedOS, FreeRTOS, Cryptography git, rally   Team Size: 6
Role:
- Requirement analysis, agile planning, and leading Team.
- Security (Cryptography) and protocol implementation. (RSA, ecdsa, ecdh, dh, AES cbc, ctr, gcm) on openssl and mbedtls as well as security (cryptography) element [OPTIGA + ATEC608)
- Secure code reviews (X86/CortexM/optee trustzone implementation). Be part of design documentation.
- Static analysis, memory leakage & optimization bug fixing.

Graphics Software Engineer
Project: Android graphics display driver on Intel HD Graphics.
Technology: C, Android, Linux, git, perforce, JIRA, Bugzilla, HSD   Team Size: 20
Role:
- Android DRM Linux Display driver Development.
- Graphics driver enablement on Pre-silicon.
- Panel fitter design, implementation & test case creation.
- Plane scaler enabling in Gen9 graphics
- NV12 enablement & test case creation on Intel GPU.

- o Up-streaming patches internally or open source community.
- o Leading & Mentoring junior team members.

BROADCOM COMMUNICATIONS, BANGALORE	**Feb 2013 – Nov 2013**

Software Engineer II

Project: Low Power Management firmware & BSP Development for LTE Modem.

Technology: C, Assembly, Armcc toolchain, Linux, Threadx   Team Size: 10

Role:
- o Profiling and optimization of Powers consumed on different power planes.
- o Responsible for fixing bugs and enhancement of codes as per requirements from Stack team.

CONCURRENT TECHNOLOGY PVT LTD, BANGALORE	**Aug 2011 – Feb 2013**

Senior Software Engineer

Project: VxWorks BSP & Firmware Diagnostic Tool Development for Intel Based SBC

Technology: C, Assembly, DIAB, GCC, TCL, Linux, VxWorks 6.8-6.9.2, FreeRTOS

Team Size: 5

Role:
- o Design, development, validation and testing of VxWorks BSP for new CPCI, VME and VPX Boards.
- o Developed a built-in firmware test diagnostic suite based on Free RTOS.
- o Developed drivers for PCH based Ethernet GEI.

APPLIED MICRO, PUNE	**July 2010 – Aug 2011**

Senior Software Engineer

Project: Multi core SOC Device Drivers Development

Technology: C, Assembly, DIAL, GCC, Linux, and Vxworks6.8

Team Size: 5

Role:
- o Design and development of multi-processor multi-channel DMA drivers, SDHC v3 drivers and processor packet queue manager.
- o Led the efforts in BSP development, modification and customization for SMP and AMP in multi core environment.
- o Ethernet packets Classification IP driver porting.

PATNI COMPUTER SYSTEMS LTD, MUMBAI	**Oct 2006 – July 2010**

Software Engineer

Project 1: Device Driver Development for Backplane Traffic Analyzer

Technology: C, VxWorks 6.7

Team Size: 3   Period: Mar 2010 – Jun 2010

Role: Design and development of USB EHCI Driver on VxBus and providing USB support to BSP.

Project 2: Multi Channel PCI Frame Grabber

Technology: C, Linux 2.6, VxWorks 6.4, KGDB

Team Size: 3   Period: Feb 2009 – Feb 2010

Role:
- o End to end responsibility for seamless execution of the project. Led the efforts across the project life cycle from requirement analysis to project planning to functional & integration testing and deployment.
- o Designed and developed key features including VxWorks Device Driver, Image processing APIs
- o Designed and developed Frame grabber Linux device driver.

Project 3: Porting of Embedded Linux and VxWorks on Coldfire M5475

Technology: Linux 2.6.25 (Freescale Ltib)   Period: Nov 2008 – Jan 2009

Role:
- o Led the efforts in development of frame buffer memory drivers for embedded platform GUI.
- o Conducted feasibility analysis for DirectFB implantation on SM501 graphics controller.
- o Responsible for testing available Linux drivers and fixing bugs on Linux kernels.
- o Ported the micro window GUI framework.

Project 4: Porting of XMK Scheduler on PIC32 Micro

Technology: MPLAB, GCC (C and assembly)

Team Size: 2   Period: Jul 2008 – Oct 2008

Role:
- o Design, coding, testing and debugging of preemptive context switching on Mplab.

Project 5: Multi channel serial add-on card design

Technology: VxWorks 6.4

Team Size: 2   Period: Jan 2008 – Jun 2008

Role:
- o Responsible for low level design, coding, testing and debugging of PCI based multi-channel (16 channels) RS232/RS485 board.
- o Developed the device driver interface for UART interface on VxWorks

Project 6: Discrete Graphics Processor Board Design

Technology: VxWorks 6.4   Period: Sep 2006 – Dec 2007
Role:
  o Responsible for high level and low level software architecture design of device drivers and applications. This involved circuit design, device driver development and GUI interface library design.
  o Conducted coding for Embedded Graphic Processor driver, SD memory card driver for dosFs file system on VxWorks, Bmp decoder, encoder, YUV converter for Application.
  o Led the efforts in functional and integration testing for SD drivers, GPU drivers and USB devices.

Project 7: Onsite Assignment at Japan
Technology: VxWorks 6.4   Period: Feb 2007 – Apr 2007
Role:
  o End to end responsibility for project life cycle from requirement analysis to design, testing and bug fixing of Embedded CPU board, Graphics processing hardware, Image Processing Board at client site.
  o Conducted rigorous testing to ensure stability of software developed.
  o Ensured timely application coding for proprietary I/O modules

Project 8: Industrial Embedded CPU Module Design
Technology: VxWorks 6.4, Linux 2.6.23, ELDK
Team Size: 4   Period: Jan 2008 – Jun 2008
Role:
  o Responsible for VxWorks BSP and boot loader development and porting the U boot boot loader for the board.
  o Responsible for design, coding, firewire OHCI, driver porting & enhancement and testing for RTC device drivers for Linux

ABB INDIA LTD, FARIDABAD   **Sep 2005 – Feb 2006**
Software Engineer
Project: Logic Design and HMI Design for Industrial Control & Automation
Team Size: 5
Role:
  o Responsible for logic programming for ABB BRC Controller and IO modules for power plant automation.
  o Wrote scripts for BRC CPU controllers and I/O modules.
  o Programmed and designed control room HMI.

ACADEMIC AND PROFESSIONAL QUALIFICATIONS

P.G. Diploma (82%) in Embedded System, 2006, Centre for Development for Advanced Computing (CDAC), Kolkata
B.Tech. (Applied Electronics and Instrumentation Engineering), 2005, Dgpa 8.35, Heritage Inst. Of Technology WB, Kolkata

PROFESSIONAL ENHANCEMENTS
  o Linux 2.6 Device Driver Training from Comptrix Systems Pvt. Ltd., Pune.
  o Workshop on Matlab Image Processing and making of ball follower robot from TRI, IIT Mumbai.
  o Industrial training on Modern Electronics Industrial Automation.
  o Training on Embedded system (8051 and PIC programming) and PLC Programming (Ladder Logic Siemens S5) from Center of Electronics Test Engineers.

ACADEMIC & Other Spare PROJECTS on Interests
Project 1: Home brew Design and implementation of voice controlled low cost personal assistant and Wi-Fi Home automation & security system based on CMU sphinx and google cloud. This includes hardware and software design for sensors and remotes actuators as well as openwrt based server. [Tool Used: RT5350, ESP8266 Wi-Fi, OpenWrt, GCC, Eagle schematic, Proteous mixed signal simulator. Involving schematic & PCB design and FUSION360 CAD design.]
Project 2: Controlling and monitoring Computerized Door lock & Attendance System [Tool Used: Linux 2.6.4.]
Project 3: Design of AVR Based USB Target I/O Board Design using AVR without any USB target controller [Tool Used: AVR GCC, Eagle schematic.]
Project 4: Controlling and monitoring Computerized Door lock & Attendance System on linux.
Project 5: IELAC (Intelligent & Efficient Logic & Analog Controller)-Low cost PLC implementation.[Tool Used: Eagle, Proteus circuit simulator, PicSimulator IDE, Mplab, Visual Basic.]
*Project 6: Autonomous Robotic Vehicle Model Design and Implementation. [*Tool Used: OrCAD, Proteus circuit simulator, PicSimulator IDE, Mplab, Visual Studio, DirectX9]

REFERENCES: On request