Joel Agnel Fernandes

Systems Engineer, Kernel Developer

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Objective

To obtain a challenging system software engineering position where I can apply my knowledge and experience to solve complex problems.

Technical Skills

Programming	C, Assembly, Embedded C, Lisp, Ruby, Python, Perl, Erlang, LaTeX, Verilog.
Processors	ARM Cortex-A, Cortex-M, ARM9, Amber core, MSP430, x86, x86-64, 8051.
OS	Linux, Android, ucLinux, Windows.
Debug Tools	GDB, KGDB, KDB, Ftrace, SystemTap, ktap, Lauterbach, OpenOCD, Eclipse, Wireshark.
Other Tools	Git, SVN, Vim, Emacs, cscope, Gnuplot, Matlab, ModelSim.

Work Experience

August 2014 -- Present **System Software Developer, Kindle and Home automation products, Amazon Lab126**

Worked on several components in low-level software stack in various amazon products.
Worked on low-memory killer algorithms, tuning of memory management algorithms in the kernel
Fixes and enhancements to Watchdog timer on Freescale and Qualcomm SoCs.
Fixes to Qualcomm's multi-processor hotplug service. Power measurements using internal tools.
Built my own prototype board to measure power using INA169 amplifier. Owned and supported battery charger driver on Qualcomm platform. Worked on Freescale's SPI master communication with FPGA.

June 2012 - July 2014 **Senior Systems Engineer**, *Linux Core Product Development, Texas Instruments*.

Embedded Systems Design, Development focusing on processors, early kernel boot, DMA and security. Active contributor to several open source and open hardware projects including:

- **Linux Kernel**: Maintainer of the EDMA DMA Engine driver. Authored several improve-ments to DMA (performance and framework). Author of OMAP DES driver for OMAP SoCs. Also, I've worked on every level of the kernel stack including machine layer, early boot code (ARM), block layer, file systems, networking and display drivers. Optimized performance and fixed bugs with heavy use of tracing, profile and debug tools. Proven track record to understand and take ownership of complex code in small amount of time and improve them.
- **U-boot**: Contributed various features and bug fixes for TI OMAP SoCs. Modified U-boot to perform secure boot on SoCs. Improved U-boot's build system for first stage loader (SPL). Improved code density of binaries by analyzing Disassembly and conducting relevant experiments.
- **OpenHardware development**: Baseport and board bring up (Linux Kernel and U-boot) for beagleboard.org boards. Developed hardware prototypes of different projects for Beagle community. Currently responsible for core Linux kernel support for TI's Davinci, OMAP and Sitara line of ARM based SoCs.

Jun 2011 - December 2011 **Embedded Systems Engineer Intern**, *ARM MPU Business Unit, Texas Instruments*. Software designer and architect of Beagleboard and Beagleboard-xM projects. Developed and debugged Display, Audio, USB, Networking, ADC subsystem drivers. Also, contributed support for Beagleboard-xM to U-boot mainline community.

September 2010 - May 2011 **Research Assistant**, *Distributed Systems Lab, University of Texas at Dallas*. Conducted research and experiments on different metrics to estimate the link conditions and thus improve routing. Modified drivers and mac80211 Linux Kernel code and carried out experiments. Worked on TCP/IP, UDP and other areas. Fixed bugs in wireless driver and packet routing/bridging code.

2008–2010 **Linux Kernel Developer**, *Atlantis Computing*, Bangalore.
Responsible for design, development and maintenance of block layer and file system components in the virtualization product stack.

Components developed:

- **dedup-fs**: A data deduplication layer in the linux kernel to deduplicate redundant blocks in the ext2/ext3 file systems. Also implemented a parallel lazy-dedup version of the same for soft real time data deduplication that scales on multi-core architectures.
- **dm-cache**: Improved linux kernel device-mapper's dm-cache module with the following enhancements:
  1. most-frequently-used (MFU) content-aware caching mechanism.
  2. Periodic write-back of dirty-blocks from cache to improve cache effectiveness.

2007–2008 **Embedded Systems Engineer**, *Siemens Information Systems Ltd.*, Bangalore.
Embedded Systems Developer in the Engine Management Systems team.
Worked on development of safety critical monitoring software layer using MSP 430 low-power microcontroller, Embedded C and Python.

Academics

Education and Achievements

2010–2012 **MS in Computer Engineering**, *University of Texas at Dallas*.

- Obtained Grade Point Average (GPA) of 3.97/4.0. "A" Grade in 10/11 courses.
- Awarded full tuition waiver scholarship by the department for Spring 2011.

2003–2007 **BE in Electronics and Communication**, *Visvesvaraya Technological University*.

- First class with distinction in all semesters (1st to 8th sem), second rank in the college.
- Received Merit Scholarship during the 2nd and 3rd year (2004–2005 and 2005–2006).

Research Interests

- Realtime Systems
- OS Schedulers
- Computer Architecture
- Multicore processors
- Concurrency
- Cache Coherent Systems

Relevant Coursework

- Computer Architecture
- Microprocessors
- Advanced Operating Systems
- Operating Systems
- VLSI Design
- Computer Arithmetic