Joel Fernandes

Linux Kernel Engineer and Systems Engineer.

Joel Fernandes
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EXPERIENCE

Google, Mountain View — Linux *Kernel Engineer*

SEPTEMBER 2016 - PRESENT

Android kernel team - Worked on Linux memory management. Improved performance of virtual address space manipulations in Linux. Worked on EAS (Energy Aware Scheduling) patches of the Completely Fair Scheduler (CFS) of the Linux kernel. Performed performance analysis and improvement of Android's Linux kernel including optimizing of Binder driver (Android's IPC mechanism) and locking mechanisms. Worked on LISA tools to better trace and understand Linux kernel scheduler behavior. Worked on tools to detect Long Critical sections in the kernel, and upstreamed it. Improved CPU frequency scaling drivers, and upstreamed fixes and improvements.

Amazon, Sunnyvale — Senior *Systems Engineer*

AUGUST 2014 - AUGUST 2016

Worked on device bring up of various products including Amazon Echo, Show, Dot, Kindle etc. Fixed issues in MMC and PMIC driver stack by working closely with Hardware engineers. Worked on a mechanism to write kernel function execution traces to PSTORE (persistent store) of the Linux kernel and upstreamed them. Fixed bugs in the Linux kernel's tracing infrastructure and upstreamed them.

Texas Instruments, Dallas — *Systems Engineer*

June 2012 - July 2014

Team member in the Base port bring up team in the Linux Core Product Development (LCPD) group. Performed bring of various ARM hardware Boards include Beagleboards. Tweaked Ethernet and USB stacks to make network boot possible. Maintained the EDMA DMA Engine driver. Authored several improvements to DMA (performance and framework). Author of various cryptographic drivers for OMAP SoCs. Worked on every level of the kernel stack including machine layer, early boot code (ARM), boot loader, block layer, file systems, networking and display drivers. Optimized performance and fixed bugs with heavy use of tracing, profile and debug tools. Responsible for core Linux kernel support for TI's Davinci, OMAP and Sitara line of ARM based SoCs.

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

OS's: Linux, Android, Windows.

Debug Tools: GDB, KGDB, KDB, Ftrace, SystemTap, ktap, Lauterbach, OpenOCD, Eclipse, Wireshark. Other Tools Git, SVN, Vim, Emacs, cscope, Gnuplot, Matlab, ModelSim, Pandas, matplotlib.

COMMUNITY

Contributed patches to various open source projects including Linux kernel operating system.

Written various high quality technical articles on Linux at his site www.linuxinternals.org

Presented talks at various conferences including Linux Plumbers conference, Embedded Linux Conference in America and Europe, Taught several classes on Linux Internals and Embedded System.

University of Texas, Dallas — Networking Researcher

SEPTEMBER 2010 - May 2012

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 routing code. Worked with professor Ravi Prakash on research assistance.

EDUCATION

University of Texas at Dallas, Richardson TX —
Masters, Computer Engineering

August 2010 - May 2012

- 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.

Visvesvaraya Technological University —
Bachelors of Engineering in Electronics and Communication

2003 - 2007

- 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).

CONFERENCES AND PUBLICATIONS (SELECTED. Full list with material is at http://www.joelfernandes.org/resources).

- Energy-Efficient Low-latency Audio on Android. Journal of Systems and Software Volume 152, June 2019, Pages 182-195 ELSEVIER.
- LWN Journal (Linux Weekly News). BPFd: Running BCC tools remotely across systems and architectures.
- Debugging Real-Time issues in Linux. Conference: ELCE 2016 (Berlin, 10/16): Also presented at Embedded Systems Conference (ESC) Silicon Valley (12/16).
- adeb: The better adb shell. Conference: Linaro Connect 2018 (Vancouver, 09/18).
- BPFd: Powerful Linux Tracing for Remote targets using eBPF. Conference: SCALE16x (Pasadena, 3/18). Also at OS Power Management (OSPM) conference on 4/18 (Italy).
- Taught several classes on Operating Systems (check joelfernandes.org/resources/ for list of topics)