Joel Agnel Fernandes

Currently a Graduate Research Assistant at the DSLab,
Majoring in MSCE at The University of Texas at Dallas.

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Objective

To obtain a Summer 2011 internship position involving the research and development of kernel, device drivers and networking systems.

Technical Skills

Programming	C, C++, Embedded C, Lisp, Ruby, Python, Perl, Erlang, LaTeX.
OS	Linux, ucLinux, Windows.
Databases	MySQL, postgres, Amnesia, SQL Server 2008.
Debuggers	GDB, KGDB, KDB, Visual Studio, Wireshark, tcpdump.
Development	Emacs, Vim, Kscope, Eclipse, Microsoft Visual Studio.

Open Source Projects and Contributions

2009–2010 **Linux Kernel**.

- mac80211: Added support to the MAC layer of the networking subsystem for Mesh networks to support communication of nodes within the mesh to nodes outside. Also fixed a bug in which mesh portals couldn't communicate with any other node if they were bridged.
- fcp: Implemented a fast-file copy/snapshot tool for the linux kernel, to help in quickly making copies of files using the ext2 and ext3 file systems. This helped create Copy-On-Write copies of huge files in a few seconds.

2010 **GILL: Gentle Introduction to Linking and Loading**, *In Progress*.
A light weight guide to linking and loading fundamentals with examples in Linux.

2010 **GDB-Kernel**.
Gdb-kernel: In the process of modifying GDB to better support kernel debugging over a serial port by learning kernel symbol addresses when kernel modules are loaded anywhere in memory.

2009 **StumpWM**.
Developed a widget for switching windows in the StumpWM window manager. Written in Common Lisp with X windows libraries on Linux.

2009 **GNU Emacs jabber-mode**.
Developed a plugin to implement new-email notification (Google's XMPP extension) in Lisp.

These projects are listed with source code at: http://github.com/joelagnel

Research Experience

Fall 2010 - Spring 2011 **Research Assistant**, *Distributed Systems Lab, University of Texas at Dallas*.
Currently working on the mac80211 Linux Kernel project which implements the IEEE 802.11 networking subsystem used by wireless device drivers. Looking at different ways to improve throughput by identifying bottle necks and optimizing the code.

Professional Work Experience

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

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

- Obtained Grade Point Average (GPA) of 4.0 for the Fall 2010 semester.
- Awarded full tuition waiver scholarship by the department for Spring 2011.

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

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

Projects

2006–2007 **Final Year Project**, *B.E. Electronics and Communication Engineering*,

Visvesvaraya Technological University, India.

Developed a tool using the C# programming language for Image Enhancement, Restoration, and Recognition using various Image processing algorithms such as principle component analysis (PCA).

2005–2006 **Research Project**, *B.E. Electronics and Communication Engineering*,

Visvesvaraya Technological University, India.

Developed a tool for compressing and decompressing binary and text files using a unique entropy encoding algorithm. Written in C.

Research Interests

- Data Deduplication
- OS Schedulers
- TCP Congestion Control
- Wireless Mesh Networks
- Kernel debugging techniques
- Filesystems for Virtualization

Relevant Coursework

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