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In Brief

“Specialization is for Insects.” - Robert A. Heinlein

A generalist with extensive experience solving problems in the trenches with a broad and varied skill set, able to design and effectively troubleshoot systems that span multiple domains, such as deeply embedded, concurrent, and communication systems.

Employment History

- **Senior Modelling Engineer** January 2022 - Current
Corellium
Design and implement high-fidelity hardware models for ARM-based SoCs to enable off-the-shelf embedded and mobile software to be executed in a fully virtual environment.
- **Senior Software Engineer** January 2019 - December 2021
Invivo / Philips Medical
Embedded software lead for an advanced research group that was developing an entirely new architecture for medical imaging utilizing modern signal processing and data management techniques built on open standards.
 - Designed high-level hardware/software interfaces implemented on Xilinx RFSoc FPGAs.
 - Performed hardware/software integration tasks, including bring up of prototype hardware and writing device drivers.
 - Created and maintained internal tool flows to support the team’s CI/CD needs.
- **Senior Software Engineer** May 2013 - November 2018
ARM Wireless Connectivity Deerfield Beach, FL
ARM WCBU offered the CORDIO family of Bluetooth Low Energy and 802.15.4 subsystems as licensable IP, including the stack and profiles, controller subsystem, digital RTL, and radio macros.
 - Software lead for the first generation of CORDIO products, defining and implementing the product’s software architecture.
 - Acted as the liaison between the RF/analog, digital, and software teams.
 - Helped define overall system architecture, working with hardware designers to design the software-hardware interfaces.
 - Created and implemented software/hardware co-verification strategies in both analog and digital realms.
 - Helped define and implement silicon characterization and production testing infrastructure.
 - Performed a leading role in bring up and characterization of internal test silicon and assisted customers with silicon bring up and debugging.

- Constructed and maintained miscellaneous internal support tools.

- **Senior Software Engineer**

April 2011 - May 2013

Sagrad, Inc.

Melbourne, FL

Constantly juggled a variety of tasks at this Engineering Services company, including contract engineering work, internal product development, sales and customer support, and miscellaneous IT tasks.

- Created Linux Board Support Packages (BSPs) for in-house Single-Board Computers (SBCs), including low-level Linux and bootloader porting, as well as device drivers.
- Developed independent IEEE802.11 (WiFi) protocol stacks and device drivers for FreeRTOS, eCOS, and Linux.
- Ported FreeRTOS to hardware based on the STM32 family of microcontrollers.
- Performed technical feasibility studies and other sales engineering tasks.
- Developed automated regression and production-line test systems, including the use of GPIB-connected instrumentation.
- Transitioned Sagrad to a continuous-integration model for software development, and other process improvements.
- Developed software to support internal business and production needs.
- Maintained the Engineering IT infrastructure.
- Maintained the Asterisk phone system.

- **Embedded Systems Engineer**

May 2002 - April 2011

AbsoluteValue Systems Inc.

Melbourne, FL

One of three employees of an embedded-systems-and-software firm, with responsibilities that are best described as “Do what needs doing”.

- Developed a full-featured cross-platform IEEE802.11 (WiFi) stack and device drivers for multiple chipsets.
- Created BSPs for new SBCs, including low-level Linux, bootloader, and device driver ports.
- Maintained a Linux distribution for wireless access points and other embedded systems.
- Designed and implemented a custom 900MHz Frequency Hopping MAC.
- Ported computationally-intensive RF modeling and visualization algorithms to GPUs using OpenCL.
- Developed an automated platform for testing multi-node wireless networks utilizing both real and virtual hardware.
- Developed a high performance 802.11 sniffer capable of synchronized captures on multiple simultaneous channels.
- Supported internal IT needs, including SCM, ticketing, and virtualizing services where it made sense.

- **Platform Developer**

May 2000 - March 2002

Incanta, Inc

Atlanta, GA

Incanta was an early pioneer in the streaming media and other cloud services spaces, building precursors to the likes of Spotify, the iTunes Music Store, secure communication platforms, and cloud storage systems. My role could be best described as DevOps, involved in nearly every project under way.

- Developed tools for support, business reporting, system testing, and large-scale service monitoring.
- Developed procedures for deployment and operations, including configuration management and tools to implement these procedures.
- Team lead on Incanta's signature Music Service, simultaneously improving scalability and reliability while enhancing the overall feature set and user experience.
- Authored a secure peer-peer communications platform similar to Nullsoft's later *Waste* platform.
- Designed and implemented a secure, distributed content delivery network.
- Designed a novel application of Dynamic DNS that was eventually patented.

Skills

- Excellent written and verbal communication skills, and an extensive track record acting as liaison between multiple engineering teams, customers, and project management.
- Willingness to learn anything and everything.
- Intimately familiar with the IEEE 802.11 family of standards, having independently implemented most of them, as well as various Internet protocols including TCP/IP, DHCP, DNS, and many others.
- Extensive experience with the Bluetooth Low Energy (aka Bluetooth Smart) link layer and the rest of the BTLE stack.
- Considerable experience with Xilinx tools, including Vivado, Yocto/Petalinux, Vitis, and PYNQ, on UltraScale RFSoc PGA platforms.
- Considerable experience working with the Linux kernel, including porting to new platforms, writing device drivers, and working with upstream to get code mainlined.
- Extensive experience with low-level C, including deeply-embedded microcontroller applications.
- Administration of CI/CD systems such as Jenkins and Gerrit backed by both public and private git repositories
- Fluent in Perl, Shell, SQL (especially PostgreSQL), Python, Expect, and PHP.
- Less fluent in Java, C++, HTML, CSS, Javascript, Assembly (MIPS, ARM, x86), L^AT_EX, Verilog, TCL, and Arabic.
- Competent at high-level design and low-level implementation across a broad swath of disciplines, including:

- Highly resource-constrained real-time embedded systems
 - Complex database systems, including web-based front ends
 - Fault-tolerant distributed systems (both client-server and peer-peer paradigms)
 - Low-level and high-level network protocols
 - Sound, Graphics, I/O, Printer, and Network device drivers
 - Reverse-engineering using sniffers and decompilation tools such as Wireshark, IDA, Ghidra, and objdump
 - Numerical processing and analysis, including the use of GPUs via OpenCL
 - Test and production automation including the use of bench instrumentation via GPIB and/or SCPI commands
 - GIS including terrain and map generation
 - Application frameworks
 - Desktop GUI applications
- Competent Linux system/database/network administrator, having run *shaftnet.org*, an old-school shell server, for over twenty years.
 - Avid amateur photographer. see <http://www.peachyphotos.com/>
 - Currently hold a multiple-entry Visa for China, valid until 2026

Current F/OSS Projects

- Gutenprint: <http://gimp-print.sf.net> Contributed support for more than two dozen dye-sublimation printers manufactured by Canon, Kodak, Mitsubishi, DNP/Citizen, Shinko/Sinfonia, Sony, and Epson. This includes the intelligent CUPS backends for Linux/OSX that are needed to communicate with these models. The majority of the necessary knowledge was obtained via reverse-engineering techniques.
- Rockbox: <http://www.rockbox.org> Rockbox is a replacement firmware for many popular Digital Audio Players. I am heavily involved with most aspects of the project, but most notably I maintain the Ingenic/MIPS platform, low-level operating system, toolchains, plus miscellaneous fixes all over the codebase.
- Photo Organizer: <http://po.shaftnet.org> A PHP-based image management tool, it emphasizes multi-user asset management over *du jour* social networking features and easily scales to hundreds of thousands of images. It is intended to be a photographer's primary image repository, and makes heavy use of advanced PostgreSQL features. I am currently the lead developer.
- ST-Ericsson CW1200: I rewrote large portions of the ST-E CW1200 WLAN device driver, and successfully worked with the Linux kernel community to get it merged into the mainline kernel. I am still listed as the active maintainer of this driver.
- The Linux-wlan project: <http://www.linux-wlan.org> A project which provides Linux device drivers for the now-obsolete Intersil Prism 802.11b (PCI, PCMCIA, and USB) chipsets. Portions of this codebase have been merged into the mainline Linux kernel.

- I have made minor contributions to countless other projects, notably including Fedora Linux, Wireshark, FreeSCI/ScummVM. I routinely poke around in software I use on a regular basis.

Education

- **Georgia Institute of Technology** Atlanta, GA
 - B.S., Computer Science
 - Specializations include network protocols, operating systems, and low-level hardware design.
 - Out-of-major focus on economics and linguistics.

TL;DR

“Miscellaneous”

Last updated April 9, 2024