Kevin N. Haw

http://www.KevinHaw.com

Objectives and Interests

To obtain challenging employment in a software architecture or technical leadership position, preferably programming embedded systems.

Synopsis of Experience and Qualifications

Creative problem solver and team player with extensive real-time embedded systems software development experience. C, C++, Python, Perl, Javascript, Typescript, and assembly for various processors. ARM, MIPS, x86, Power PC, 8051 and other processors. Bluetooth Low Energy (BLE), R4CE and ZigBee RF protocol embedded applications. Security research for the Internet of Things (IoT). Device driver, kernel, and application software for Linux, Solaris UNIX, and other real time operating systems. Experienced with low level interfaces to hardware devices: DMA hardware, embedded microcontrollers, FPGAs, UARTs, serial flash devices, etc. Python applications for real time ZigBee applications, serial control, socket level Internet communication, XML parsing and generation, and source code generation (COG). Code development tools: IAR Workbench, Eclipse, gcc, make, shell scripts, Perforce, GIT. Developed applications and tools for Windows and UNIX platforms. Taught undergraduate and extension courses in UNIX for California State University, Fullerton. Well versed in software requirements specification, design, code, test, and formal qualification. Experienced in UML software design tools and techniques. Numerous awards for process improvement initiatives. Two Master of Science Degrees: one in Software Engineering and one in Computer Science. A good mix of programming experience, leadership roles, and instructional knowledge gives me a unique perspective on software development, letting me see it from both the developer driven, low level and customer driven, "big picture" viewpoints.

Professional Experience (Software Development)

Principal Engineer, ioXt. Newport Beach, California.
May November 2019 to present.

- Developed testbed fixture for remote research of security for ZigBee IoT devices. As demonstration exploited known “insecure rejoin” weakness in ZigBee to allow online visitors to unlock deadbolt door lock without a password via a live video link.
- Developed proof of concept simulated ransomware to analyze encrypted ZigBee traffic patterns to identify door lock devices and revoke all PIN and RFID codes until ransom is paid.
- Managed subcontract for ZigBee testing fixture, doing local hardware setup and integration with scripts and firmware provided by subcontractor in Europe.
- Wrote a demonstration Angular.io web portal in Javascript/Typescript to manipulate a MySQL database via HTTP requests to a PHP backend to run on Google Cloud Platform (Compute Engine). Maintained Angular.io portal developed by subcontractor.
- Documented deployment and maintenance processes for AWS hosted web portal.
- Part of small team that applied for patent on proprietary business process.

Senior Software Architect, Universal Electronics. Santa Ana, California.
May 2016 to November 2019.

- Software Architect with Advanced Innovations group. Designed and implemented projects with emphasis on low power consumption, high reliability, and reduced manufacturing cost, primarily for home entertainment remote controls and Internet of Things (IoT) products.

- Host and target side serial protocol to automate factory test of BLE and RF4CE RF performance, IR communication, physical keyboard, LEDs, and configuration management.
  - In the first project where this automated test was fielded, the labor cost for post manufacture testing in the factory was reduced by 57%.
- Host and target configuration suite to reduce software development costs by customizing Bluetooth Low Energy (BLE) and RF4CE behavior, product model information, and acoustic microphone parameters across product models as well as MAC addresses and serial numbers for individual units while using same software executable. Included machine generated source code components.
  - Goal is to eliminate 3 man month cost to create new software build for a new model and eliminate third party manufacturing tooling for setting unit MAC address in factory.
- Wrote customer facing and internal white papers to explain and advance new features and technology initiatives, emphasizing stakeholder benefits.
- Upgrades to existing ZigBee home security products (Door/Window Sensor and Alarm Keypads), including implementation and customer certification.
- Supervised software engineers on above and other projects.

Senior Software Staff Engineer, Broadcom Corporation. Irvine, California.
March 2011 to May 2016.

- Software engineer for Broadband Communication group. Supporting embedded Linux multiple processor core "platform on a chip" copper Digital Subscriber Line (DSL) and fiber optic Ethernet Passive Optical Network (EPON) modems and routers for domestic and international markets.
  - Worked on bonded DSL line drivers for Asynchronous Transfer Mode (ATM) and Packet Transfer Mode (PTM) DSL traffic, allowing doubling of end user bandwidth over existing copper infrastructure. Redesigned interrupt handling of driver for MIPS and ARM platforms to use dedicated thread for receiving packets to offload processing from interrupt context.
  - Redesigned ATM bonding autosense function, replacing legacy design in favor of optimized state machine. Implemented portions of Broadcom's proprietary ATM Nitro™ mode.
  - Fielded customer support requests from throughout the world for customized patches, aid in customizing Broadcom reference software. Enhanced debug utility capabilities to allow better diagnosis by customer developers. Corrected bugs in debug "port mirroring" feature.
  - Ported entire existing Linux source code baseline (kernel, driver, and userspace code) for new line of EPON chips. Tested using proprietary gate level simulator and then worked on "bring up" team with original delivered silicon. Developed guides and checklists to document process for subsequent product line efforts.
  - Added extended network traffic statistics to Linux kernel. Modified drivers for Ethernet, network bridge, ppp, vlan, ATM/PTM, and proprietary packet accelerator and integrated with ifconfig utility and web statistics reporting mechanism.
  - Wrote Linux driver for MIPS core to load dedicated EPON MAC and manage DMA communications between both cores. Implemented field download for new and legacy EPON MAC products.
  - Integrated JFFS2 flash memory file system for use on embedded Linux platform.

Senior Software Engineer, Boeing Company. Anaheim, California.
December 2003 to March 2011.

- Software engineer for Fedora Redhat Linux and Solaris UNIX platforms for real time acoustic processing on P-8A Multimission aircraft, aircraft trainer, and foreign sales follow on products.

- Implemented (design/code/test) acoustic data transfer manager to process 64 channels of mission critical acoustic data over gigabit Ethernet LAN in real time. Modular design, object oriented methodologies, and C++ allowed for later expansion of product to other platforms and vendors.
- Rewrote NATO specification for static acoustic data storage as streaming TCP/IP protocol, which served as a primary driver for $6 million worth of subcontracts.
- Implemented software application to control, manage, and diagnose two different vendor units, a 64 channel RF receiver and a high capacity data recorder.
- Created a Python maintenance utility to control an acoustic data recorder over TCP/IP.
- Used rapid development techniques with HTML/CSS and Javascript to quickly prototype and test operator interface changes.
- Coordinated interface development with acoustic data receiver and recorder subcontractors.
- Used IBM Rational UML framework tools for various design tasks.
- Used Python testing framework to test hardware simulator for aircraft system trainer.

- Developed manufacturing checkout and configuration procedures to ensure that only properly tested digital media was distributed to the fleet.
- Software engineer for acoustic processing on P-3 antisubmarine aircraft.
- Developed technical proposal for expendable acoustic sensor for littoral surveillance.

Professional Experience (Instruction)

Computer Science Lecturer, California State University, Fullerton. Fullerton, California.

- Taught "Design of the UNIX Operating System" and "Introduction to UNIX" for traditional undergraduate students and working professionals through university extension program.
- Proposed, created, and taught a new course at the university, "UNIX System Programming."
- Authored supplemental materials for classes, including 102 page study guide.
- Member of advisory board for UNIX Certificate to set policy and curriculum for the certificate.

Formal Education

Master of Science Degree in Software Engineering, California State University, Fullerton. Fullerton, California.

- Capstone project “Protecting Sensitive Data While Outsourcing Software Development Projects” and my white paper "Comparison of Version Control Systems for Software Maintenance" are available at my personal website, KevinHaw.com.
- Member of Upsilon Pi Epsilon honor society.
- A member of the first graduating class to earn this degree at Fullerton.

Master of Science Degree in Computer Science, California State University, Fullerton. Fullerton, California.

- Emphasis in hardware interface topics and object oriented design.

Bachelor of Science Degree in Computer Science, minor in Mathematics, California State University, Fullerton. Fullerton, California.

Side Projects

- As “Northcott Consulting,” wrote recreational Android applications.
- Hosted above and miscellaneous projects at personal website, KevinHaw.com.