Jonathan Cressman

Software Developer, Embedded Systems

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Experience

Corellium March 2023 - Present
Hardware modelling (Contract)

- Modelling Silabs efr32mg24 system on a chip and board
- Reverse engineering how the processor works
- Creating a virtual 802.15.4 network

Swidget Sept 2022 - March 2023 (Contract)
Principal IoT Developer Dec 2020 - April 2022 (Full Time)

- Scoped requirements, wrote code, tested and integrated with other vendors' devices
- Created a single firmware build that can handle 50+ permutations of hardware allowing a simpler manufacturing process
- Designed code to be modular with clean layers of abstraction allowing code to be reused on two other projects
- Quickly wrote multiple drivers for replacement board components due to component and chip shortages

Alarm.com April 2022 - Nov 2022
Embedded Engineer (Contract)
DSC Alarm Panel Integration

- Reduced the image size from 215KB to 115KB to allow OTA upgrades and add new features
- Added structure and modularization to the code to allow the code to be reused and more easily maintained
- Documented the DSC Panel protocol and alarm.com's functionality

Machine to machine communications, Jan 2003 - June 2020
Wireless IoT Protocols and Cryptocurrencies (Various Contracts)

- Reverse engineered, documented and tidied code
- Analysed viability of the Thread wireless mesh networking protocol for clients IoT devices
- Verified proofs of security and reviewed academic papers for cryptocurrencies
- Validated and tested cryptographic systems with short deadlines and no tolerance for errors
- Thoroughly documented all work

Skills

Languages C, C++, C#, Assembly, PHP, JavaScript, Python

Protocols ZigBee, 802.15.4, Thread, Matter, 6LowPan, CoAP, TCP, UDP, IP, SPI, I2C, JTAG, DHCP, MQTT, UART, REST, HTTP, TLS

Sensors Air Quality, motion, temperature, humidity, luminosity, occupancy, pressure, vibration, current

Cryptography Post quantum cryptography, elliptic curves, signatures, FIPS 140

Tools Logic analysers, Windows, Linux, Git, SVN, Eclipse, multi meter

Certifications ISO 17025, Common Criteria Assurance Level 4

Interests

Computer Security, post quantum computing,
Security for small embedded devices
Cryptocurrencies and decentralized systems

Hobbies Hiking, camping, running, swimming, soccer
live action role playing

Projects

Zigbee ZTT Test Automation contributor

- Created test scripts for testing Zigbee devices
- Tested and debugged the Zigbee alliance test tool
- Documented how to use the tool and insights to the tool's working

Cryptocurrency Review

- Reviewed technical papers and provided expertise for the privacy cryptocurrencies Monero and Zcash

Education

Bachelor of Math
University of Waterloo

- Specialization in Pure Mathematics and Combinatorics and Optimization

Experience Continued

Xylem Inc. Jan 2017 - June 2020
Principal IoT Developer (Contract)

- Worked on the leading edge of Zigbee, often the first to implement new features
- Anticipated customer needs during internal design stage, implemented key additional flexibility features ahead of 5+ year utility upgrade cycle
- Co-authored Zigbee electric vehicle supply management cluster
- Doubled Zigbee Network Joining test coverage, and rewrote 75% of legacy tests leading to 50% faster test execution time
- Led Zigbee spec modification solutions to solve multi-vendor legacy interoperability issues

Entrust Datacard 2015 - 2016
Security Assurance

- Tracked security vulnerabilities across all Entrust products
- Evaluated and prioritized vulnerabilities in both Entrust code and in third party tools incorporated into Entrust products
- Evaluated new technologies and developments in cryptography particularly in post quantum computing

Energate Inc. 2008 - 2015
Embedded IoT Engineer

- Implemented Zigbee protocol firmware code for gateways, thermostats and load control devices
- Advocated for simplified standards at Zigbee committee meetings, negotiated with stakeholders to improve the specifications
- Communicated with many other companies to facilitate interoperability between Energate devices and their devices
- Helped our partners troubleshoot communications issues
- Avoided many issues in early spec iterations by leading development of both client and server implementations

IPeak Networks/LiveQOS 2007 - 2008
System Architect

- First engineer hired
- Designed and engineered a system that became the company's main product for the next 10+ years
- Designed a protocol for hijacking an existing TCP/UDP connection to run proprietary forward error correcting algorithm over the connection. Patent granted for the protocol
- Implemented majority of the initial product. Designed and implemented test plan, fixed all bugs
- Company grew to over 100 employees

Wind River Systems 2006 - 2007
Senior Engineer – Network Stack

- Maintained the BSD based TCP/IP network stack for VxWorks used in devices with hard real time communications constraints

Packet Motion / Cloud Shield 2004 - 2005
Network Processor Programmer

- A network processor is a chip with many hardware assisted multi threading cores designed for high data throughput
- Increased packet throughput 11x, increased traffic analysis scope, assisted sales, marketing and hardware design
- Implemented a high level scripted language on a network processor

IBM, DOMUS ITSL 2003 - 2004
Senior Security Products Evaluation

- Evaluated security products to FIPS 140, Common Criteria and other standards
- Taught IBM internal cryptography courses
- Devised both physical and logical attacks against secure devices - required learning new products, reading source code, PCB layouts, writing specialized code