Kiwamu Okabe - Fullstack Engineer

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Brief

I launched my career on developing embedded devices using Unix-like kernel at Ricoh Company, Ltd. The experience was not only for designing device drivers but also including debug of virtual memory. And I have experience in IoT platfom such as ARM Cortex-M MCU and RTOS. Also I learned application design using functional language such as Haskell[1], and published some research papers[2] about such languages.
I would like to continue to pursue quality improvement technologies (including security) regardless of the software layer.

Skill Sets

Deep knowledge for Unix-like Kernel and User Space

I am an expert for Unix-like kernel such as Linux, because I provided technical support for NetBSD[3], which is a Unix-like OS similar to Linux, at Ricoh. My skill is not only for NetBSD but also Linux. In fact, a race condition bug in PowerPC Linux kernel was fixed by me in only five days at MIRACLE LINUX.

Wide experience in IoT platform

I have a wide experience in IoT platform such as FreeRTOS, ChibiOS/RT[4], ARM Cortex-M, ESP8266, AVR and MSP430. Also I launched a new IoT business using TWELITE wireless platform[5] at Centillion Japan.

Research Security and Quality

A prototype of own Secure-OS similar to OP-TEE[6] was designed by me at SELTECH. It runs with the other RTOS on ARM Cortex-M MCU. Also I have a wealth of experience in strong static typing language such as Haskell and verification of C language such as VeriFast[7], which are useful to keep the quality of products.

Computer Skills

- Languages: C (12 years), Haskell (5 years), Intel/ARM assembler (5 years), Ruby (5 years), C++ (3 years), PHP (2 years), OCaml (2 years), SQL (1.5 years), Python (1 year), Erlang (1 year), JavaScript (1 year), R (1 year), Go (0.5 years)

- Platforms: Linux (15 years), NetBSD (12 years), Cygwin (2 years), FreeRTOS (1.5 years), ChibiOS/RT (1.5 years), Android NDK (1 year), MinGW (1 year), Yocto (1 year)

- Database: MySQL (2 years)

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[1] https://www.haskell.org/
[2] http://www.metasepi.org/papers.html
[3] http://netbsd.org/
[4] http://www.chibios.org/
[5] https://mono-wireless.com/
[6] https://github.com/OP-TEE/optee_os
[7] https://github.com/verifast/verifast

Work Experience

August 2022 - Present: Systems Engineer (permanent employee) at Systemi.co.ltd

Responsibilities:

- Developing payment application running on Android tablet designed with Kotlin language

May 2021 - Present: Freelance Researcher

Responsibilities:

- Improving the quality of open source OS

Key Achievements:

- Found the root causes of FreeBSD OS bugs and vulnerabilities with SRE postmortem style, and avoided them with ATS and VeriFast[8]

August 2021 - February 2022: Systems & Applications Engineer (permanent employee) at NXP Japan Ltd.

Responsibilities:

- Technical support for NXP Microprocessors

Key Achievements:

- Supported audio application using Yocto Linux and Android platform

December 2020 - April 2021: Software Engineer (permanent employee) at Donuts Co. Ltd.

Responsibilities:

- Maintained an ERP web application using PHP, Zend Framework, JavaScript, MySQL, and AWS

Key Achievements:

- Created a black-box testing tool running Docker to get better performance and keep quality
- Created a summarizer of MySQL query log using Go language

July 2013 - November 2020: Freelance Researcher

Responsibilities:

- Researched and developed Ajhc Haskell Compiler[9]
- ATS language[10] evangelist for embedded devices
- Verification evangelist using VeriFast[11], which is a verifier C language programs annotated with preconditions and postconditions

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[8]https://github.com/metasepi/postmortem
[9]http://ajhc.metasepi.org/
[10]http://www.ats-lang.org/
[11]https://github.com/verifast/verifast

Key Achievements:

- Published some research papers[12]

- Translated ATS documents into Japanese[13]

- Translated VeriFast documents into Japanese[14]

October 2019 - March 2020: Software Engineer (trustee agreement) at QuantumCore COR-PORATION

Responsibilities:

- Ported a machine learning called "reservoir computing" onto ARM Cortex-M MCU

- Ported the machine learning onto Android platform

Key Achievements:

- Developed a library for linear algebra running on ARM Cortex-M MCU

February 2018 - July 2018: Software Architect at (contract employee) SHINKAWA LTD.

Responsibilities:

- Researched and developed new software platform for wire bonding during semiconductor device fabrication

Key Achievements:

- Created a parser to understand SHINKAWA own embedded script language

- Evaluated EtherCAT[15] protocol for the realtime application

August 2014 - October 2017: Part-time Researcher at RIKEN Advanced Institute for Computational Science

Responsibilities:

- Researched functional programming for embedded platform

Key Achievements:

- Published some research papers[16]

November 2016 - October 2017: Expert Engineer (permanent employee) at SELTECH CORPORATION

Responsibilities:

- Researched and developed new Secure-OS for ARM Cortex-M platform

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[12]http://www.metasepi.org/papers.html
[13]http://jats-ug.metasepi.org/
[14]https://github.com/jverifast-ug/translate
[15]https://www.ethercat.org/
[16]http://www.metasepi.org/papers.html

February 2016 - November 2016: Software Engineer (contract employee) at Life Robotics Inc.

Responsibilities:

- Developed GUI application running on Ubuntu OS, using C++ and Qt[17] for single arm robot

Key Achievements:

- Designed a network protocol for the robotics application

March 2015 - February 2016: System Enginner (contract employee) at Centillion Japan Co., Ltd.

Responsibilities:

- Technical support for stock chart application using JavaScript
- Maintained MySQL database servers
- Manager for offshore development in China

Key Achievements:

- Launched new IoT business for farming
- Design a platform[18] to accelerate R[19] programs

September 2014 - December 2014: Software engineer (trustee agreement) at Axsh co., LTD.

Responsibilities:

- Developed an OpenFlow application named "OpenVNet"[20]

Key Achievements:

- Provisioned and automated deploying the OpenVNet on AWS platform using Ruby and GNU make

March 2012 - July 2013: Software Engineer (permanent employee) at MIRACLE LINUX CORPORATION

Responsibilities:

- Developed own Digital Signage platform running on Intel architecture using Linux OS, C++, OpenGL, GTK+[21], GStreamer[22]
- Supported and debugged own Linux distribution

Key Achievements:

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[17]https://www.qt.io/
[18]https://github.com/centillion-tech/kick-r
[19]https://www.r-project.org/
[20]https://github.com/axsh/openvnet
[21]https://www.gtk.org/
[22]https://gstreamer.freedesktop.org/

- Debugged and fixed a race condition in the SMP kernel on PowerPC platform

- Debugged and fixed bug of crash[23] command's PowerPC virtual memory

- Designed new Windows installer using NSIS[24]

April 2001 - February 2012: Software Development Engineer (permanent employee) at Ricoh Company, Ltd.

Responsibilities:

- Developed own platform for multi-function printer based on NetBSD OS

Key Achievements:

- Developed OptionBIOS and bootloader for the platform on Intel architecture

- Designed secure boot for the platform on Intel architecture

- Compressed boot time of the printer onto 10 seconds

- Verified m:n POSIX thread library

Education

- March 2001: Master of Engineering from Department of Electrical and Electronic Engineering, Tokyo Metropolitan University.
  The thesis: "Multimode Quartz Crystal Microbalance"[25]

Publications and Reports

- Kiwamu Okabe and Hongwei Xi. "Arduino programing of ML-style in ATS"[26]. ML workshop, 2015.

- Kiwamu Okabe and Takayuki Muranushi. "Systems Demonstration: Writing NetBSD Sound Drivers in Haskell"[27]. Haskell Symposium, 2014.

- Kiwamu Okabe. "ATS 言語を使って不変条件を API に強制する".[28] 夏のプログラミング・シンポジウム 2014, 2014.

- Kiwamu Okabe, Hiroki MIZUNO and Hidekazu SEGAWA. "強い型による OS の開発手法の提案"[29]. 第 55 回プログラミング・シンポジウム, 2014.

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[23]http://people.redhat.com/~anderson/
[24]http://nsis.sourceforge.net/
[25]http://ci.nii.ac.jp/naid/110004076869
[26]http://www.metasepi.org/doc/metasepi-icfp2015-arduino-ats.pdf
[27]http://metasepi.org/doc/metasepi-icfp2014-demo.pdf
[28]http://www.metasepi.org/doc/20141101_prosym_summer2014.pdf
[29]http://metasepi.org/doc/20140110_prosym55.pdf

Activities

Open-source projects

Metasepi Project[30]

- Challenge to create an open-source Unix-like operating system designed with strong type such as ML or Haskell.

- Rewriting NetBSD kernel using Ajhc Haskell compiler. `https://github.com/metasepi/netbsd-arafura-s1`

Ajhc Haskell compiler[31]

- Extend and add embedded features to Jhc Haskell Compiler `http://repetae.net/computer/jhc/`.

- Ajhc has thread-safe and reentrant runtime. Also has Erlang style GC. It means Ajhc's Haskell context has own GC heap. GC can run on tiny CPU such as Cortex-M3 with 32kB RAM.

Japan ATS User Group[32]

- An user group for ATS language promotion of utilization. Translating ATS documents into Japanese.

Debian Maintainer[33]

- Maintained uim package at Debian squeeze, and packages using Haskell at sid.

Last updated: August 12, 2022

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[30]`http://metasepi.org/`
[31]`http://ajhc.metasepi.org/`
[32]`http://jats-ug.metasepi.org/`
[33]`http://qa.debian.org/developer.php?login=kiwamu@debian.or.jp`