Kiwamu Okabe - Research and Development Engineer

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Interests

I launched my career on developing embedded devices at Ricoh Company, Ltd, and learned application design with functional language such like Haskell. I found Metasepi project[1] that trying to apply strong type to embedded programming. For first challenging, I developed embedded Haskell compiler named Ajhc[2]. Today, I choose ATS language[3] as embedded functional language, and found "Japan ATS User Group[4]" that holds translations about the language. And I'm implementing[5] these technology on tiny MCU such like ARM Cortex-M series and 8bit AVR for practical use.
Metasepi is very experimental and ambitious project, however I believe it also introduces an by-product "the technology to design real software with predictable manpower and safety" out of embedded domain.

Work Experience

March 2015 - Present: System Enginner at Centillion Japan Co., Ltd.

- Software engineering for cloud computing

August 2014 - Present: Part-time researcher at RIKEN Advanced Institute for Computational Science

- Research embedded functional programming

July 2013 - Present: Self-employed Software Engineer at METASEPI DESIGN

- Research and develop Ajhc Haskell Compiler
- Support to develop any embedded software
- ATS language consulting
- Manage Metasepi Project and develop the core technology

September 2014 - December 2014: Software engineer at Axsh co., LTD.

- Develop an OpenFlow application named "OpenVNet" [6]

[1] http://www.metasepi.org/
[2] http://ajhc.metasepi.org/
[3] http://www.ats-lang.org/
[4] http://jats-ug.metasepi.org/
[5] http://fpiot.metasepi.org/
[6] https://github.com/axsh/openvnet

March 2012 - July 2013: MIRACLE LINUX CORPORATION

- Verify PowerPC Linux and debug/fix SMP Race Condition
- Debug and fix PowerPC crash command's virtual memory paging BUG
- Design new Windows installer using NSIS
- Introduce and maintain new git server for internal use
- Verify and tune performance of Digital Signage on new hardware

April 2001 - February 2012: Software Development Engineer at Ricoh Company, Ltd.

April 2010: Port OS to new x86 hardware

I ported NetBSD-2.0 to new x86 hardware, and calculated boot time before porting OS.

April 2008: Develop and technical support NetBSD OS

I became technical leader to maintain and support Ricoh's multifunction printer. Also I debuged and fix many kernel level BUGs. I designed power down process by software trigger.

April 2006: Develop POSIX thread library

I replaced user level POSIX thread library with NetBSD-2.0 m:n thread. My efforts are following.

- Research the presence of thread-safe and cancel-safe in kernel, libc and libpthread.
- Write test code to get thread-safe and cancel-safe.
- Add API into the m:n thread library. Because printer application depend on the missing API.
- Debug and fix signal BUGs in the m:n thread library.

June 2004: Tune multifunction printer boot time as 10 seconds

Before my tune, the printer boot time is 30 seconds. Ricoh's multifunction printer "imagio" [7] use the method and tool, ever now. Develop a tool analyze log dumped by bootloader, kernel, init process and application. Analyze IPC network, and advice how to get speed to application developer. Split application as groups for pre-boot and post-boot.

October 2003: Develop new BIOS for multifunction printer

Develop new custom BIOS together at the United States.

November 2002: Design secure boot for multifunction printer on x86

I re-designed bootloader to support public key algorithm authentication, and designed the format include secure key in SD card

July 2001: Develop BIOS and bootloader for multifunction printer on x86 architecture

My first work at Ricoh. Ricoh's multifunction printer "imagio" [8] use my bootloader design, ever now. Also I designed hardware dependent data structure to configure bootloader and kernel, and Option BIOS to boot on SD card

[7] `http://www.ricoh.co.jp/imagio/`
[8] `http://www.ricoh.co.jp/imagio/`

Education

- March 2001: Master of Engineering from Department of Electrical and Electronic Engineering, Tokyo Metropolitan University.
  The thesis: "Multimode Quartz Crystal Microbalance" [9]

Publications and Reports

- Kiwamu Okabe and Hongwei Xi. "Arduino programing of ML-style in ATS" [10]. ML workshop, 2015.
- Kiwamu Okabe and Takayuki Muranushi. "Systems Demonstration: Writing NetBSD Sound Drivers in Haskell" [11]. Haskell Symposium, 2014.
- Kiwamu Okabe. "ATS 言語を使って不変条件を API に強制する". [12] 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" [13]. 第 55 回プログラミング・シンポジウム, 2014.

Activities

Open-source projects

Metasepi Project [14]

- 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 [15]

- 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 [16]

- An user group for ATS language `http://www.ats-lang.org/` promotion of utilization. Translating ATS documents into Japanese.

Debian Maintainer [17]

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

[9] `http://ci.nii.ac.jp/naid/110004076869`
[10] `http://www.metasepi.org/doc/metasepi-icfp2015-arduino-ats.pdf`
[11] `http://metasepi.org/doc/metasepi-icfp2014-demo.pdf`
[12] `http://www.metasepi.org/doc/20141101_prosym_summer2014.pdf`
[13] `http://metasepi.org/doc/20140110_prosym55.pdf`
[14] `http://metasepi.org/`
[15] `http://ajhc.metasepi.org/`
[16] `http://jats-ug.metasepi.org/`
[17] `http://qa.debian.org/developer.php?login=kiwamu@debian.or.jp`

Carettah [18]

- A presentation tool written with Haskell. My slides `http://www.slideshare.net/master_q/` are created by the tool.

Computer Skills

- Languages: Haskell, C, ATS, Intel assembler, Ruby
- Platforms: Linux, NetBSD, Android NDK, MinGW

Reference available upon request

- Kentaro Kuroiwa Research Chief - Centillion Japan Co., Ltd.
- Yasuhiro Yamazaki CEO - Axsh Co., Ltd.
- Takayuki Muranushi - RIKEN Advanced Institute for Computational Science
- Takashi KODAMA CEO - MIRACLE LINUX CORPORATION
- Shigeya SENDA - Ricoh Company, Ltd.
- Hitoshi Sekimoto Professor - Tokyo Metropolitan University, Department of Electrical and Electronic Engineering

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[18] `http://carettah.masterq.net/`