

San Diego, CA 92131
(858) 356-8195
gjinki@gmail.com

Kimyoung Jin

From R&D to Mass Production, Embedded Software Engineer.

Skills

- Extensive expertise in C/C++, Assembly, Python, Perl, Shell Scripts, MFC, C#, and Java.
- Proficient in developing Linux device drivers for peripheral hardware.
- Skilled in creating BSP components such as scheduling, interrupt handling, concurrency management, synchronization mechanisms, IPC, clock and voltage management, error handling, GPIO handling, UART and SPI, memory management in firmware, and Android Kernel.
- Proficiency in comprehending hardware schematics and configuring DTSI files.
- Experienced in power management development.
- Proficient in WLAN software development (from device driver to frameworks) for Android/Linux platforms.
- Solid understanding of 802.11, TCP/IP, and PCIe.
- Proficient in developing automation programming to avoid duplicate jobs.
- Capable of crafting bare-metal firmware from inception.
- Capable of FPGA verification.
- Strong knowledge of NAND Flash Memory, File Systems, and DRAM, SATA.
- Able to develop bootloaders and firmware updating tools.
- Able to develop software on Linux/Unix/Windows.
- Skilled in porting software to various RTOS platforms such as Nucleus, PSOS, and REX.
- Proficient in utilizing various debuggers including GDB, WinDBG, and JTAGs.
- Competent in developing DBMS (Data Management Systems) and creating applications with MYSQL, SQL Server, and SQLite.
- Experienced in debugging issues and resolving troubleshooting challenges during product development.
- Able to develop web services and software utilizing REST APIs for AWS, Google Cloud, and Microsoft services.
- Background includes extensive experience in mass production over the last 15 years, with a primary focus on BSP software.

EXPERIENCE Summary

- Qualcomm Atheros – Senior Staff Software Engineer : Jan 2012 – Dec 2023.
- Samsung Electronics, Memory Division – Software Engineer : Jul 2007 – Dec 2011
- INERVIT – System Software Engineer : Mar 2004 – DEC 2006.

PROFESSIONAL WORK EXPERIENCE

Qualcomm Atheros, San, Diego, CA – Senior Staff Software Engineer

Jan 2012 – Dec 2023

Developed Qualcomm WIFI solutions spanning five generations, with a keen focus on addressing BSP aspects for both firmware on ARM/Q6 and platform driver in Android Kernel. Specialized bootloader, scheduling, interrupt, DMA, memory, clock/voltage control for power management, PCIe in both of WLAN FW and Android Kernel, collaborated closely with multiple HW design teams and other sub system teams.

- WLAN Firmware / WLAN Platform driver
- BSP – Scheduling / Interrupt / concurrency / synchronization / IPC / Clock / Voltage / Error Handling
- Working on co-operations with other sub systems - MODEM / Audio / PMIC / AOP / Bluetooth

Collaborated with multiple OEMs(Google/Samsung/Xiaomi/OPPO) to help the board bring-up and worked closed to launch OEM's projects.

Designed and developed automation tools with a primary focus on functionality, scalability, and user convenience. Notable projects include

- Runtime Log Analysis Service for Salesforce
- Crash Triage System
- Linux Ramdump Parser tool for DKMS (Dynamic Kernel Module) - WIFI host driver
- WIFI/Bluetooth Subsystem Dump parsing tool with TRACE32

Samsung Electronics – South Korea, Software Engineer

July 2007 – Dec 2011

Developed SSD Firmware from beginning of SSD business, focusing on reliability extension and performance functionality.

- Nand Flash Controller Control Layer Software
- Nand Flash Reliability Extension Software
- Bootloader for FW and FW updating tool
- BSP – Timer, Interrupt, IPC, Error Handling
- Power Management - DDR, CPU clock

Collaborated closely with Nand Flash Controller RTL design team and Nand Flash Memory team at Samsung Electronics to maximize a performance with multiple channels and minimize a response time using profiling and verified FPGA and developed SW simulator for Nand Flash Layers.

- Developed the bare metal firmware for NAND/SATA verification on FPGA
- Ported the previous generation firmware for FPGA verification with test tools
- Bad Nand Block Analyzer
- Developed Simulator for Nand Flash Controller Control Software for Windows

INERVIT – South Korea, System Software Engineer

Mar 2004 – DEC, 2006

Developed Main Memory Based DBMS (Database management System) on Unix/Linux Systems

- Developed SQL Parser and optimizer

Porting DBMS for Mobile platforms. Worked with Samsung Mobile and SK telecom, EU Carriers – Orange, Vodafone

- Develop APIs for File System, Memory Management for RTOS.
- Porting to other RTOS (nucleus, psos, REX)
- Samsung Handset Platform (Mocha, Ocean)
- Developed Basic Applications for EU carriers.

Independent Contractor – South Korea, Software Engineer

2007

- File System Simulator for Mac System
HFS(Hierarchical File System) to FAT32 Translator on Windows with Samsung Semi conduct
- TRACE32 Automation Controller for MMC devices with Samsung Semi conduct

EDUCATION

Soongsil University, South Korea

Jun. 2007

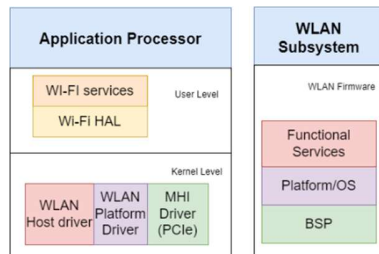
BS, Computer Science, GPA 3.76/4.5

AWARD

Korea National Software Contest of - the Ministry of Information and Communication (2002) - 2nd prize

- Armari : integrated intranet-system in cyber apartment.

PROJECTS



Qualcomm WIFI solutions

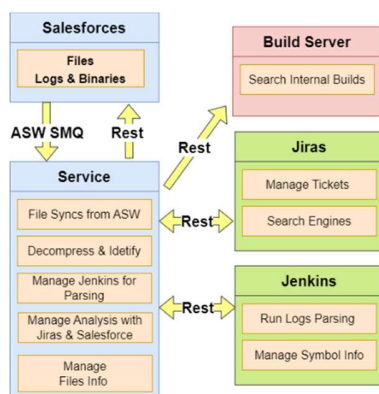
Developed WLAN platform driver responsible for loading WLAN firmware and managing clock/voltage parameters for WLAN hardware, in accordance with the hardware schematic provided by OEMs and developed ath10k WLAN host driver for Chromebook project.

Worked on the BSP (Board Support Package) layer and OS layer to schedule tasks, manage IPC (Inter-Process Communication), handle interrupts and synchronizations, oversee clock and voltage control, manage PCIe hardware, collect WLAN firmware dumps, and facilitate their transfer to the WLAN Platform driver on the Application Processor for debugging purposes and saving it as the specific format of binaries.

Addressed various WLAN functional issues spanning from the bottom layer (WLAN firmware) to the top layer (user application). Additionally, resolved multiple hardware-related issues by capturing waveforms and collecting ETM (Embedded Trace Microcell) data on the WLAN hardware.

Addressed Android Kernel issues related to scheduling, concurrency, memory, and IPC, and collaborated closely with the AOP/PMIC team to tackle power management issues.

Project challenge: Difficult to get a snapshot at an error scene and understand behaviors of HW blocks.



Runtime Log Analysis Service with Salesforce

Implemented a robust runtime log analysis service integrated with Salesforce, streamlining collaboration between Qualcomm and OEMs. In the previous legacy model, the process of issue reporting and log file management was inefficient, involving manual file downloads and elf information matching.

Transformed the workflow by deploying an innovative log parsing system. The system leveraged AWS (Amazon Web Services) for file synchronization, using AWS SQS (Simple Queue Service) to detect and sync new log files to internal servers. Logs were categorized based on type, and parsing tools were initiated using Jenkins automation.

The service culminated in the automatic updating of Salesforce, notifying stakeholders if uploaded symbol files (e.g., Elfs) did not align with their respective logs. Furthermore, the service facilitated the sharing of candidate patches for issue resolution.

Project challenge:

- **Concurrency Control:** Addressed the formidable challenge of managing concurrent processing of bulk files in multiple cases. Employed Jenkins to ensure effective concurrency control, optimizing efficiency and reliability.
- **Load Balancing:** Successfully resolved load balancing issues, ensuring smooth and consistent performance throughout the project by utilizing Jenkins, an integral component in maintaining system stability and performance.

Crash Triage System

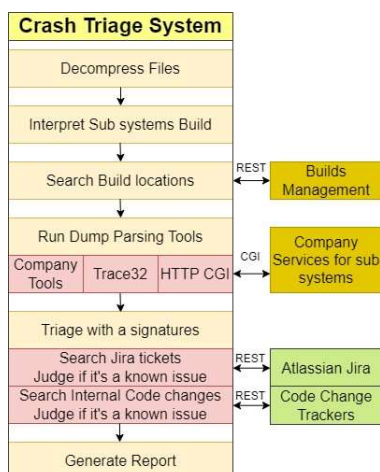
Designed and developed the front-end tools to triage a crash dump for Qualcomm MSM, it consisted of multiple subsystems such as Application Processors, MODEM, WLAN, Bluetooth, Audio, RPM(Resource Power Manger), Android Framework.

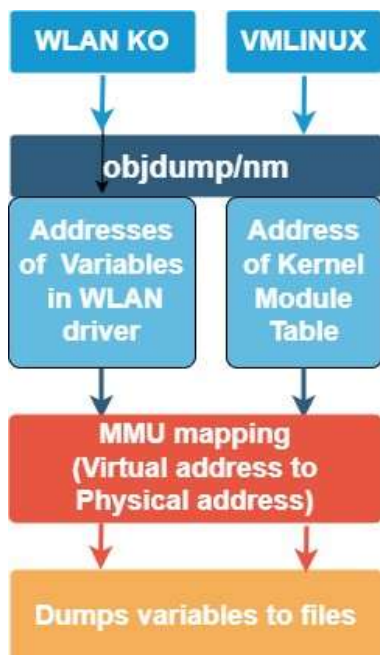
Crafted a versatile solution that automated the process of reading symbol information from dump files, dynamically searching build locations, and parsing relevant subsystem logs (e.g., ADSP, PCI, RPM) to provide a comprehensive overview for debugging purposes.

Facilitated a holistic approach to debugging by interfacing with the company's log parsing servers through CGI/REST protocols, fostering a big-picture perspective for issue resolution.

This front tool seamlessly interacted with JIRA, creating a ticket for issue tracking and searched the error signatures with similar known tickets in jira and code change tracker server. It generated a report with candidate fixes by searching similar tickets.

Project challenge: A accuracy of candidate fixes – build a judgement rule is challenged.





Linux Ramdump Parser tool for DKMS(Dynamic Kernel Modile) - WIFI host driver

Designed and developed a parser tool for Linux Ramdumps, specifically tailored for Dynamic Kernel Module – WLAN host driver.

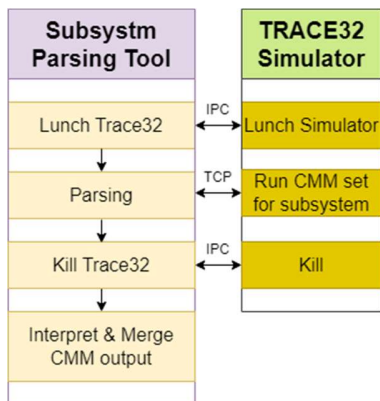
When Phone user hit a crash, the phone captured DDR snapshot & data immediately. Some data were saved as plain texts in DDR snapshot, potentially exposing private information. Google pixel team requested a parsing tool extract essential WLAN host driver information, facilitating efficient debugging processes while preserving user data privacy. Legacy LRDP didn't support DKMS before Google requested to QC and I had to expand functionalities within LRDP.

Project challenge: Understanding LRDP python scripts and understanding the mapping logic for Dynamic Kernel Module.

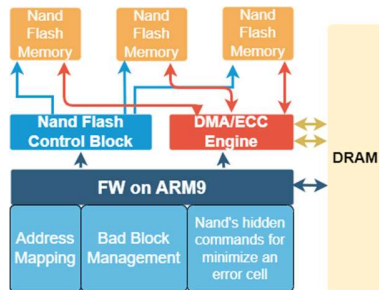
WIFI/Bluetooth Subsystem Dump parsing tool with TRACE32

Conceived and designed a front-end tool to streamline the parsing of WIFI and Bluetooth subsystem(firmware/driver) dumps using TRACE32, a debugger and emulator tool. The tool's functionalities included:

- Launching TRACE32(Debugger) remotely.
- Loading dump files and the relevant ELF (Executable and Linkable Format) files into TRACE32.
- Executing PRACTICE Scripts (CMM - Component Monitoring and Manipulation) tailored for WIFI or Bluetooth subsystem: These scripts extracted critical variables from the ramdump and stored them in files for subsequent interpretation.
- Organizing activities within modules in chronological order, making the output more understandable and coherent.



The tool significantly contributed to enhancing the comprehension of the control message flow across multiple modules within WLAN and Bluetooth subsystems. By providing a structured view of these subsystems, it facilitated debugging and troubleshooting efforts.



SSD(Solid State Drive) firmware

Designed and developed firmware for SSDs on the ARM9 architecture, with a focus on implementing fundamental operating system functionalities over SATA interface.

NAND flash memory had physical limitations - characterized by a finite number of PROGRAM/ERASE cycles, which varies between 10K cycles for MLC (Multi-Level Cell) and 1K for QLC (Quad-Level Cell). Ensured uniform exercise of all physical blocks to extend the lifespan and reliability of NAND flash memory.

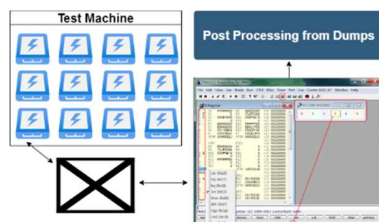
Collaborated closely with the NAND Flash memory design team, gaining deep insights - there were multiple hidden ways to get correct data out from wore out cells like adjusting read/erase/program voltage levels on NAND Flash memory and developed these skills on FW to ensure the reliability of data retrieval.

Project challenge: Concurrent Execution with HW Blocks

Confronted the challenge of optimizing firmware to overlap its execution time with the activities of hardware (HW) blocks. This required precise coordination and synchronization to ensure that firmware processes operated efficiently alongside busy HW blocks, ultimately enhancing SSD performance. My team calculated each cycle and execution times for DRAM/SRAM accessing on FW with RTL team and optimize FW as much as possible.

Debugging scripts on TRACE32 for SSD

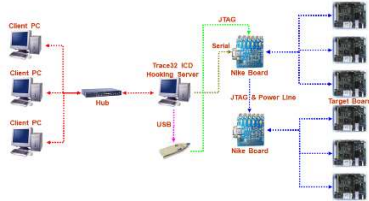
SSD had no separate storage to save DRAM and HW blocks snapshot at a failure since the storage size is very big so it required a run time debugging over JTAG.



Test Team run hundreds of devices for each test cycle, Debugging with JTAG took long times by checking global variables on SW.

To save a debugging time and lower a debugging difficulty, I developed debugging script set what run on JTAG debugger – TRACE32. It dumped critical SW data/HW snapshot to files on Host. Script detected an abnormal state of HW blocks which used verified on FPGA and SW bugs which debugged before.

Project challenge: To control HW blocks in TRACE32 script, I had to understand all receipt from HW team. It required extra efforts to understand HW activities. It might be impossible unless I had verified FPGA.



Remote Tester(T32 Hooker) for MMC cards

A goal of project was to save money, not to buy expensive equipment and to share trace32 for multiple devices.

Designed and implemented Windows Program what monitor TRACE32 and execute it remotely and control a specific board which had multiple jtag ports with a switch, for massive tests remotely.

The program flash new image and run test consequently on each MMC card by switching JTAG ports. It reduced ton of human efforts.

Project challenge: It was very difficult to verify JTAG switch function on HW. The HW debugging and SW debugging required together.