Introduction to the Jasmine OpenSSD Platform

Jinyong Ha(jinyongha@csl.skku.edu)
Computer Systems Laboratory
Sungkyunkwan University
http://csl.skku.edu
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## Schedule

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Project Overview

- **Project #1. Log Block FTL**
  - “A Space-efficient Flash Translation Layer for CompactFlash Systems,” 2002
  - Implement on OpenSSD Platform

- **Project #2. Term Project**
  - Implement other FTLs
  - Performance, Reliability
  - ...
Jasmine OpenSSD Platform
Storage Device
HDD vs SSD
The OpenSSD Project

- It is an initiative to promote research and education on the recent SSD technology
- Providing OpenSSD platforms on which open source SSD firmware can be developed
Indilinx Jasmine Platform

- Barefoot Controller (ARM7TDMI-S)
- Power Switch
- NAND Flash Module
- SATA 3.0Gbps
- Power
- Mobile SDRAM
- JTAG
- UART
- Factory Mode Jumper
Hardware Architecture

![Hardware Architecture Diagram](image)

- **SRAM (96KB)** Controller
- **NAND Flash**
- **NAND Controller**
- **Buffer Manager**
- **SATA Device**
- **DRAM Controller**
- **Memory Utility**
- **Clock Generator**
- **APB Bridge**
- **UART**
- **GPIO**
- **Timer**
- **WDT**
- **PMU**
- **ICU**
- **JTAG**

*ICE3028: Embedded Systems Design (Spring 2013) – Jin-Soo Kim (jinsookim@skku.edu)*
Development Guide
Development Environment

- Hardware Requirement

- Software Requirement
  - Code Sourcery G++ Lite Edition for ARM EABI
  - MS Visual Studio 2010
  - MS Visual Studio Express Free Edition 2010
  - Jasmine OpenSSD Firmware
Hardware Setup

Serial
UART
RS 232 Cable

SATA Cable
Power Cable
SATA
Power
Hardware Setup

SATA to USB gender
Software Setup

- Code Sourcery G++ Lite Edition for ARM EABI
  - To build firmware binary (firmware.bin)

- MS Visual Studio 2010 & MS Visual Studio Express Free Edition 2010
  - To build the firmware installer (install.exe)

- Hyper Terminal
  - To debug firmware with serial communication
  - BAUD_115200/8/N/1/X
Firmware & Installer

- Download Jasmine Firmware
  - http://www.openssd-project.org

- Build firmware
  > cd ./build_gnu
  > build.bat

- Build the firmware installer
  - Open & build ./installer/installer.sln
  - Move ./installer/install.exe to ./build_gnu
Install Firmware

- Power-up Jasmine board as ‘*Factory Mode*’

- Run installer
  
  ```
  > cd ./build-gnu
  > install.exe
  ```
Install Firmware

- Install for the first time
  - 1 -> 2 -> 6 -> 3

- Re-install
  - 1 -> 2 -> 3
Run Firmware

- Power-down Jasmine board
- Power-up Jasmine board as ‘Normal Mode’

- Now, Jasmine is ready to process SATA command
Technical Resource

- Download resources from OpenSSD Wiki
  - http://www.openssd-project.org
  - FTL Developer’s Guide
  - Jasmine Firmware
Contact TA

- Office: #85561 Computer Systems Lab.
- E-mail: JinyongHa@csl.skku.edu
Any Questions?