Introduction to the Jasmine OpenSSD Platform

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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
  • ...

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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]

- **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**
- **NAND Flash**
- **SATA Host interface**
- **DRAM**
- **JTAG debug port**

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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
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](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’

![Factory Mode](image)

- Run installer
  
  ```
  > cd ./build_gnu
  > install.exe
  ```

![Device Manager](image)
Install Firmware

- Install for the first time
  - $1 \rightarrow 2 \rightarrow 6 \rightarrow 3$

- Re-install
  - $1 \rightarrow 2 \rightarrow 3$
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](http://www.openssd-project.org)
  - FTL Developer’s Guide
  - Jasmine Firmware
Contact TA

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- E-mail: yjwoo@csl.skku.edu
- Phone: 010-8887-7148
Any Questions?
Software Setup for Linux

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

- Patch for Linux Installer
  - Download ‘linux.patch’ file from below article
  - OpenSSD Wiki > Forum > Jasmine OpenSSD Platform > Jasmine Hacks > installer linux port
Software Setup for Linux

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

- Build firmware
  > cd ./build_gnu
  > make

- Build the firmware installer
  > patch –p1 < ./linux.patch
  > cd ./installer
  > make
  - Move ./installer/installer to ./build_gnu
Software Setup for Linux

- Power-up Jasmine board as ‘Factory Mode’
  ![Factory Mode Image]

- Run installer
  ```
  > cd ./build_gnu
  > sudo ./installer
  ```