

myfs: My Own File System!

Jaewon Choi

jaewon.james.choi@gmail.com

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Introduction

- In this assignment, we are going to implement our own file system which supports RAID 0 on the user level file system – FUSE.
- Objectives
 - Understand the basic file and file system operations
 - Get to know the file system development process on user space
 - Have an opportunity to implement a system that considers performance

What is FUSE?

- Filesystem in User space
- You can easily implement file system in user space by fill the file operation callback functions.
- We will use FUSE version 2.9.7
 - <https://github.com/libfuse/libfuse/tree/fuse-2.9.7>
- Reference
 - <https://www.slideshare.net/danny00076/fuse-filesystem-in-user-space>
 - Some Chinese, but great material.
 - https://en.wikipedia.org/wiki/Filesystem_in_Userspace

What is RAID and RAID 0?

- One way to take advantage of disk arrays to improve the system's performance, reliability, and scalability.
- Check out the text book part of Chapter 11.
- References
 - <https://en.wikipedia.org/wiki/RAID>
 - https://en.wikipedia.org/wiki/Standard_RAID_levels#RAID_0

RAID 0 implementation

- RAID 1(replication) implementation code will be provided by default. Change this code to RAID 0.
- All write and read should be done considering stripes.
- In this assignment, a stripe size is 512B.
- You need to analyze the code and the basic example of FUSE to gain an understanding of FUSE.
- Tip: **We strongly recommend that you implement after having a clear understanding of FUSE.**

Grading

- RAID 0 Implementation (50%)
 - Functional testing!
- Report (50%)
 - Describe FUSE and its operations defined as callback functions (40%)
 - Explain what RAID is and characteristic of RAID 0, 1 and 5 in terms of performance. (40%)
 - E.g. Why RAID 0 is fast when read/write, but why it is risky.
 - Etc. (10%)
 - Feedback, Improvement opportunity on your code, and so on
 - **WARNING: you MUST attach a reference list. If not, you'll get zero point on the report.**
 - **Please send the report in PDF format.**

Guides

- Before starting to code, install FUSE on your system.
 - To install FUSE, type...
 - `sudo apt install libfuse-dev`
 - But I recommend compiling FUSE from source code (It will help you to be more familiar with unix-like systems).
 - You can find the source code of fuse at this link:
 - <https://github.com/libfuse/libfuse/releases/download/fuse-2.9.6/fuse-2.9.6.tar.gz>
- Fork this repository, clone it, and code!
 - <https://github.com/AEIS-Lab/myfs>
- Ask to mailing list: ajou-2017-fall-operating-systems-qna@googlegroups.com
- Good luck 😊