Paper Review

“ FusionFS: Fusing I/O Operations using CISCOps in Firmware File Systems ”

1. Summary

FusionFS is a direct-access firmware-level in-storage filesystem, which significantly reduces dominant I/O overhead and introduce a fine-grained crash consistency and fast recovery mechanism.

Storage techniques develop fast. However, the read write call is still a big overhead especially in FUSE. FusionFS is designed to solve this problem. It first provide a library for direct access to storage devices. It provide a CISCOps to replace RISCOps (like sys write call) to reduce call times.

Its fast recovery techniques by using MicroTX. MicroTX can be independently committed and recovered after a system failure.

Its evaluation results showed that it performs well in high throughput scenarios.

2. Advantages

+ Use CISC to reduce system call since it can do more things by one call. Though the large ISC means more efforts to do translation, but a wider ISC can reduce the cost of putting of instructions.
+ There are many techniques to optimize FS, such as the optimization of system layers, write order, cache and formats. FusionFS focus on reducing system layers. And fundamentally let the software lib directly visit storage devices’ firmware.

3. Disadvantages

– I am doubt that the storage manufacturer won’t provide such driver or interface since it’s commercial secrets.

QIN FEIRAN qinfr@shanghaitech.edu.cn 01/05/2022