

# Implementation of A PCIe Device

## PCIe 介面裝置之實作

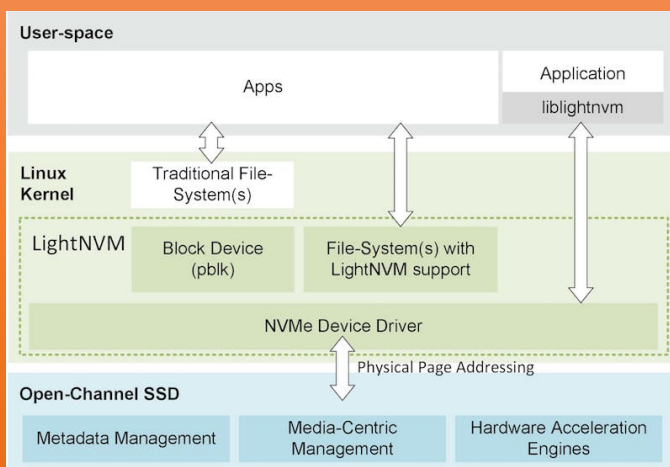
組別：A07 指導教授：呂仁碩 組員：張簡崇堯

### Abstract

SSDs is being widely used in data-center and storage arrays nowadays. In these usage scenarios, performance predictability is a crucial requirement for high-performance applications in modern multi-tenant data centers since applications need such predictability to satisfy SLAs. However, the performance of traditional SSDs vary greatly, which means the read/write latency is hard to predict and the SLAs can't be satisfied.

To solve this issue, researchers invented a new storage solution, combining LightNVM, the Linux Open-Channel SSD subsystem, and Open-Channel SSDs. The new solution exposes physical flash chips to host and allow LightNVM take control of them. Experiment result shows that LightNVM can be customized to satisfy performance predictability with modest host system overhead.

### System Structure



### Experiment Procedure

Since I don't have an OCSSD, I just test LightNVM on VM. After the virtual environment is ready, I need to modify Linux kernel config to activate pblk support then compile and install it on the host system, mount the virtual disk, install the LightNVM package. After finishing all the steps, I use FOX software to measure the read/write latency in a multi-tenant usage scenario.

### Results and Conclusion

The experimental results are not ideal, the latency is still too high, but I think if I can run the test on a real Open Channel SSD, the result might be better. I think the virtual machine I/O may be delayed by the host system and the virtual machine engine.

### Reference

[1] Matias Bjørling, Javier González, Philippe Bonnet, LightNVM: The Linux Open-Channel SSD Subsystem, FAST '17