ECE5658: Operating Systems Design – Paper Critique

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이성우

1. Ceph: a scalable, high-performance distributed file system, OSDI 2006

- This paper proposed new distributed file system, Ceph. It is object-based distributed file system which provides high performance, reliability, and scalability. This paper also introduces some challenges of it: scalability, performance and reliability to improve. Ceph improves them by changing the structure of OSDs. In this paper, the prototype is introduced, but currently, Ceph's OSD backend has improved through FileStore, NewStore and BlueStore. To use the transaction reliability, CEPH tried many solutions to improve itself. Recently, it uses BlueStore as backend to save data. Data is stored in raw device and metadata is stored in LevelDB. I think Ceph can be improved by focusing on key-value store efficiency.

2. Barrier-enabled IO stack for flash storage, FAST 2018

- This paper addresses the storage order problem and proposed order-preserving device layer. At first, it addresses the storage order problem: transfer and flush. This is due to the physical characteristics of the rotating media such as HDDs. The new scheme uses two new functions, fbarrier and fdatabarrier to guarantee ordering not durability, so it can optimize fsync workload efficiently. Moreover, it eliminates the transfer and flush in controlling the storage order. I think this is good paper because it proposed the new I/O stack for the flash storage that can improve the overall performance. However, it is not good point that it is only focused on journaling file system.