

CSC 568 Project Proposal

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Introduction:

Since the advent of the internet, the technology industry has been steadily moving away from local storage to remote, server-based storage and processing known as cloud storage. The entertainment industry has also been steadily moving towards video on demand and thus increasing the importance of efficient use of Cloud Storage and CDN.

Project Idea:

Our project aims at developing a primitive cloud-based object storage system with features relevant to the current use cases. The proposed features of the system are as follows:

- Object-based storage
- Addition of tags and user-defined metadata to the files for easier search.
- Versioning of files.
- Synchronization features
- Multipart and concurrent upload mechanisms
- Mirroring Capabilities
- Server-side Encryption capability
- Reducing Redundant File Storage
- Notification Mechanism

Architecture:

When a file upload request is received, the system first checks if the block already exists (via the Block Index using checksum). If it exists both the files point to the same parent file. If not a target volume is chosen to store the block. The volume is chosen from the cells in such a way as to evenly distribute cell load and minimize network traffic between storage clusters. Commands to the storage devices are issued, which all fsync the blocks to disk (or onboard SSD) before responding. If this was successful then a new entry to the Block Index and can return successfully. If any storage device fails along the way, then retries are done with another storage volume. Background tasks are run to clean up any partial writes for failed operations.

References:

- [1] Haythem Yahyaoui, Samir Moalla "CloudFC: Files Clustering for Storage Space Optimization in Clouds" 2016 IEEE International Conference on Cloud Computing Technology and Science (CloudCom). Luxembourg, pp. 193-197 Dec. 2016.
- [2] Cheng Chang, Jianhua Sun, Hao Chen "Coral: A Cloud-Backed Frugal File System" IEEE Transactions on Parallel and Distributed Systems pp. 978 - 991 Apr. 2016.