IIT Kanpur

CS632 Course Project

Secure and Fault-tolerant Peer to Peer Distributed File System

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1 Objective

The objective of this project to study about the implementation of a peer-to-peer based distributed file system. The traditional client-server based file system models have been often criticized on the lines of the popular debate of centralization vs. decentralization. Hence, in this project we explore some implementation techniques required in a peer-to-peer based distributed file system.

We propose to implement the following modules in this project:

- A client will get an option to upload a file in the network.
- The client will get an option to download the file from the network.
- A file will be divided in chunks, with each chunk then distributed to a number of nodes maintaining a specified degree of replication.
- The meta-data related to the chunk distribution would be stored in the network instead of being stored on a single server. This will enable a user to download a file from anywhere in the network.
- Files can be accessed using a single user authentication or a group authentication. (*Group authentication:* Only the members of a group which are authorized will be able to access the files tagged for that group.)
- *raft*[1] consensus protocol will be used to ensure the fault-tolerance in the system.
- The chunks would be secured cryptographically before being stored on various nodes.
- Efficient algorithm for chunk distribution to enhance the download speed of a file.
- We plan of using a structured directory for accessing the resources.

2 Key features

Following are the key features of this project:

- Consistency of replicas
- Peer-to-peer network.
- Fault-tolerant network of peers.
- Secure file sharing system.

References

[1] John Ousterhout Diego Ongaro. In Search of an Understandable Consensus Algorithm. https://raft.github.io/raft.pdf, 2014. [Online; accessed 27-September-2018].