Programming Assignment 2

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Objective To create a distributed file system for reliable and secure file storage.

Server

The servers mainly have following functions:

- List
- Get
- Put
- Verify User and Password
- Reading Configuration File

List

List function will go through each directory, go through each file name under each directory. I store all file names as a string and send to the client.

Put

First servers will receive the hash value of the file in order to find the corresponding file pieces option from hash table. And then each server receives filename and part name to store files under its directory.

Get

Given the server name, the get function will go to the corresponding directory. According to the command line, it only find pieces of file which we want. If file found, it will store the part number and content in a structure. Then get function sends a part number of a file followed by its content, then the second piece of file part number and followed by its content.

Read and Write Protocol

I defined a simple reading and writing protocol here and do every sending and receiving information in these functions. Every information will always be transmitted in this format:

Client

List

At client side, it receives a long string from each server of the file names. Then do some parsing and store file names as a linked list. To find whether a file is reconstructable, go through each node of

the list, if a new file name is founded, remove it from the link list and read its part number. Here we have an array with 4 zeros represents 4 parts. If a part is founded, change value from 0 to 1. Finally, if all pieces are found prints file name, otherwise prints file name followed by [incomplete].

Put

Put function will read file from current directory and then splict the file into 4 pieces with same length. Before we split file, compute the hash value of the whole file and find the uploading option in the table to upload the file to server.

Get

Get function will read file pieces from each server and combine them together. First it reads the part number, in a similar way as link function, using an array to mark the pieces we recive. If the file is reconstructable, combine the file otherwise prints "File is unconstructable".

Other functions

Verify User name and password

When the connection starts, server reads information from its configuration file and client sends the user name and inforamtion to server after reading its configuaration file. And the server side, it stores ws.conf in a structure and compare with the information from the client. If matches, create a folder for current user under each server's directory and go on to receive other request. Otherwise, close the socket and prints "Invalid user name and password."

Encryption and Decryption

At the client side, it computes the 32 bits hash value before spliting the file. And computes the hash values again after using get function to combine all pieces.

Create Subfolder

For Get, Put and List command, if client and server find out the subfolder name in the command line, it will create a subfolder with the name under the directory of current user and implement everything under this subfolder.