Distributed and Parallel Computing Lab

CS461 Lab7

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Task: Implementation of a Distributed File System in python.

This lab focuses on the implementation of a Distributed File System using Python, where multiple client-server interactions are facilitated through a structured architecture. The system is designed to handle multiple user authentications, ensuring secure access to shared resources.

DFC (Distributed File Controller) serves as the main client application that interacts with the various distributed servers. It manages user authentication and facilitates file operations. **DFS1, DFS2, DFS3,** and **DFS4** are the distributed servers responsible for storing and managing files.

DFC Side:

Part1: Putting a book

```
D:\Python\DFSystem>cd D:\Python\DFSystem\DFC

D:\Python\DFSystem\DFC>python dfc.py dfc.conf
username: Suraj
password: Suraj
Authorization Granted.
Connected to server DFS1
Connected to server DFS2
Connected to server DFS3
Connected to server DFS4
From DFS1: Authorization Granted.

From DFS2: Authorization Granted.

From DFS3: Authorization Granted.

From DFS4: Authorization Granted.

Please specify a command [get, list, put]: list

Current DFS1\Suraj files:
--------------------------
There are no files yet.

Current DFS2\Suraj files:
--------------------------
There are no files yet.

Current DFS3\Suraj files:
--------------------------
There are no files yet.

Current DFS4\Suraj files:
--------------------------
There are no files yet.

Would you like to get files, put files, or exit?
```

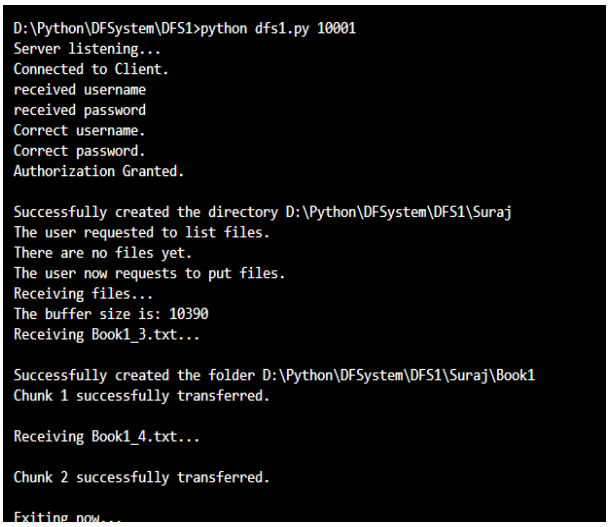
```
Would you like to get files, put files, or exit?
[get, put, exit]: put
Current files:
---------------
Book1
Book2


Please specify a file: Book1

Sending Book1_3.txt...


Sending Book1_4.txt...


Sending Book1_1.txt...


Sending Book1_2.txt...

DFS1 Chunk 1 transfer complete.
DFS2 Chunk 1 transfer complete.
DFS3 Chunk 1 transfer complete.
DFS4 Chunk 1 transfer complete.

Sending Book1_4.txt...


Sending Book1_1.txt...


Sending Book1_2.txt...


Sending Book1_3.txt...

DFS1 Chunk 2 transfer complete.
DFS2 Chunk 2 transfer complete.
DFS3 Chunk 2 transfer complete.
DFS4 Chunk 2 transfer complete.

Exiting now...
```

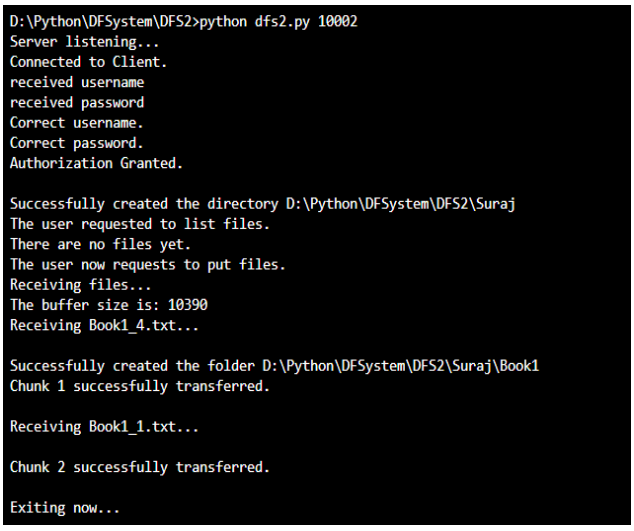
Upon running the dfc file, first user(here Suraj) is authenticated. After successful authentication, all 4 servers are connected and granted authorization. After that first through **list** command checked if there is any file uploaded or available. Through **put** command Book1 was uploaded and that was distributed in the servers in chunks after successful transfer.

DFS Side:

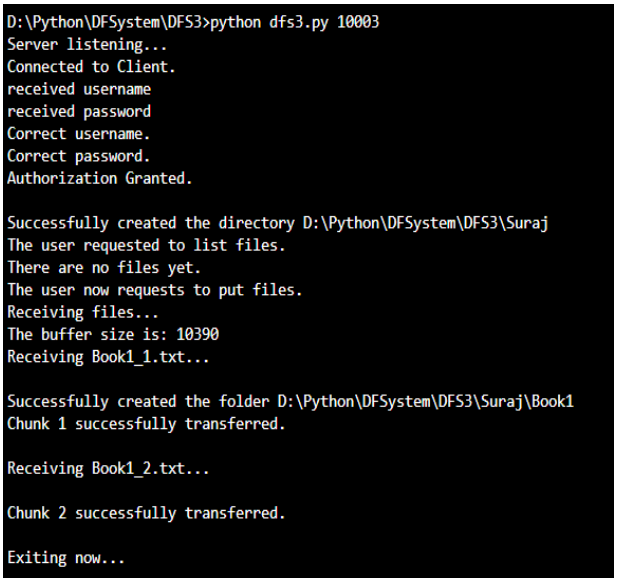
Display of the 4 servers are shown below while upload by Suraj:

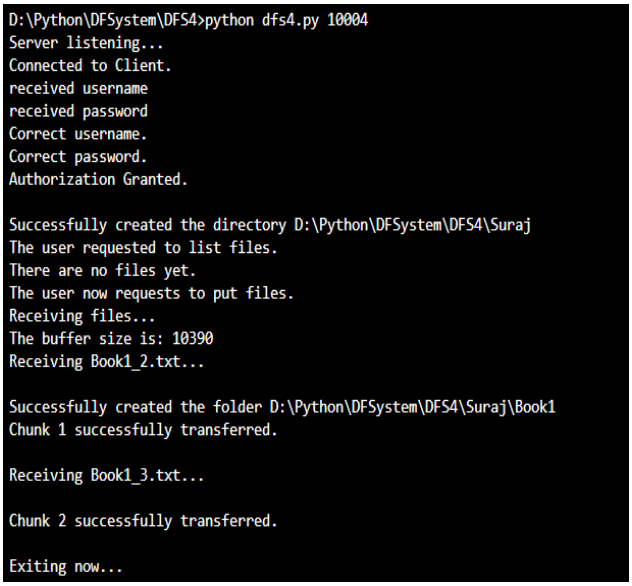
Server 1 and 2





Server 3 and 4





Here we can see, Suraj as a user was authenticated by each server and granted access after successful login. For upload, a directory is created automatically. When Suraj uploaded Book1 then it was broken into chunks and received by the servers successfully. Each of the servers received 2 chunks of the book. After successful transfer server exists.

DFC Side:

Part 2: Getting a book

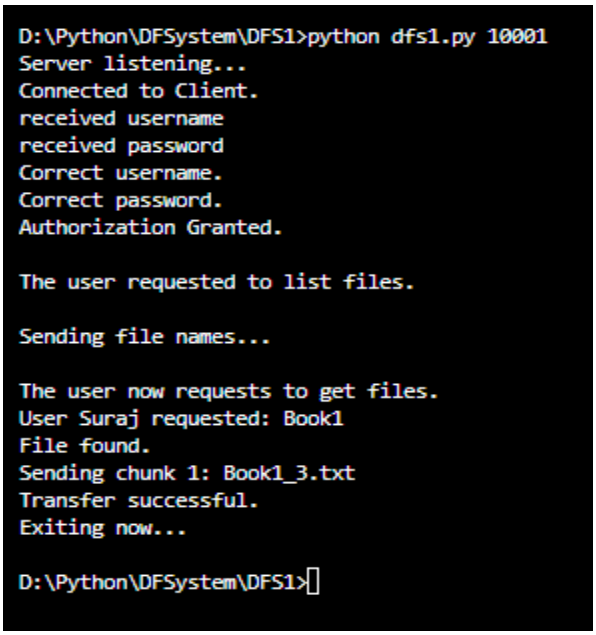
```
D:\Python\DFSystem\DFC>python dfc.py dfc.conf
username: Suraj
password: Suraj
Authorization Granted.
Connected to server DFS1
Connected to server DFS2
Connected to server DFS3
Connected to server DFS4
From DFS1: Authorization Granted.

From DFS2: Authorization Granted.

From DFS3: Authorization Granted.

From DFS4: Authorization Granted.

Please specify a command [get, list, put]: list

Current DFS1\Suraj files:
--------------------------
Book1_3.txt
Book1_4.txt


Current DFS2\Suraj files:
--------------------------
Book1_1.txt
Book1_4.txt


Current DFS3\Suraj files:
--------------------------
Book1_1.txt
Book1_2.txt


Current DFS4\Suraj files:
--------------------------
Book1_2.txt
Book1_3.txt


Would you like to get files, put files, or exit?
[get, put, exit]: get
Successfully created the directory D:\Python\DFSystem\DFC\Suraj
Please specify a file: Book1
File chunks successfully transferred.
File chunks successfully transferred.
File chunks successfully transferred.
File chunks successfully transferred.
A total of 4 chunks arrived.
All four chunks are present.
File successfully reconstructed.
Exiting now...

D:\Python\DFSystem\DFC>
```

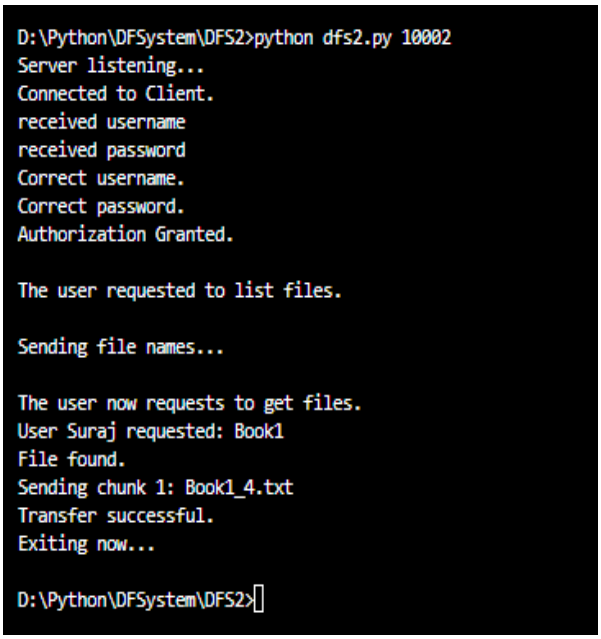
Here after successful login, we can see chunks of book sare available server wise. Now thorugh get command we can get the full book. With get after book was specified, the file transferred successfully in 4 chunks and then the file was reconstructed.

DFS Side:

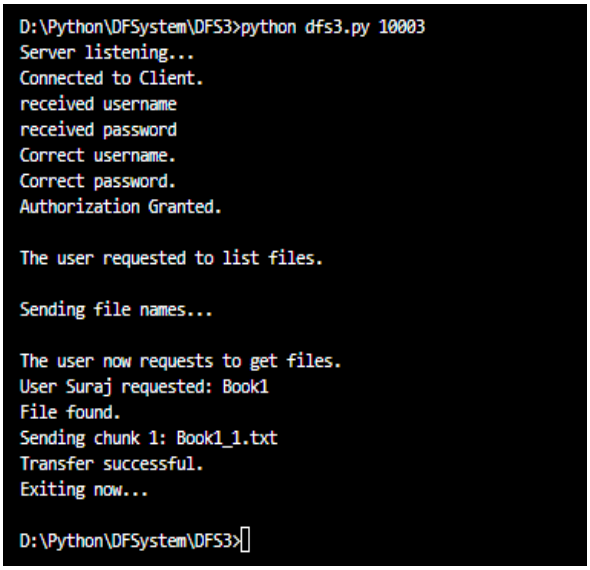
Display of the 4 servers are shown below while get(receive) file by Suraj:

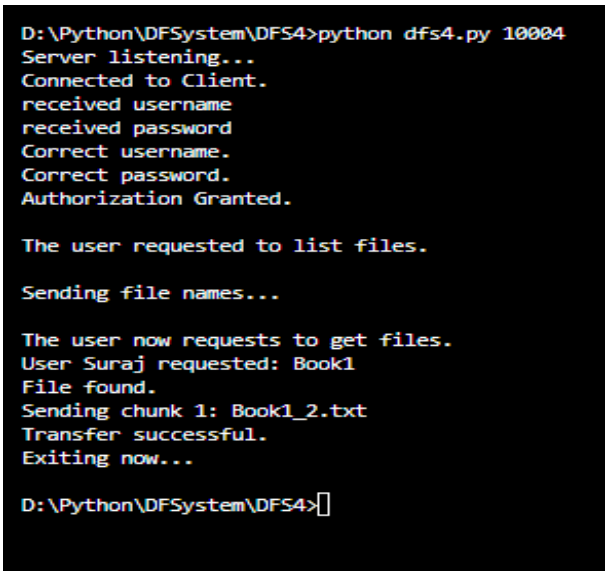
Server 1 and 2



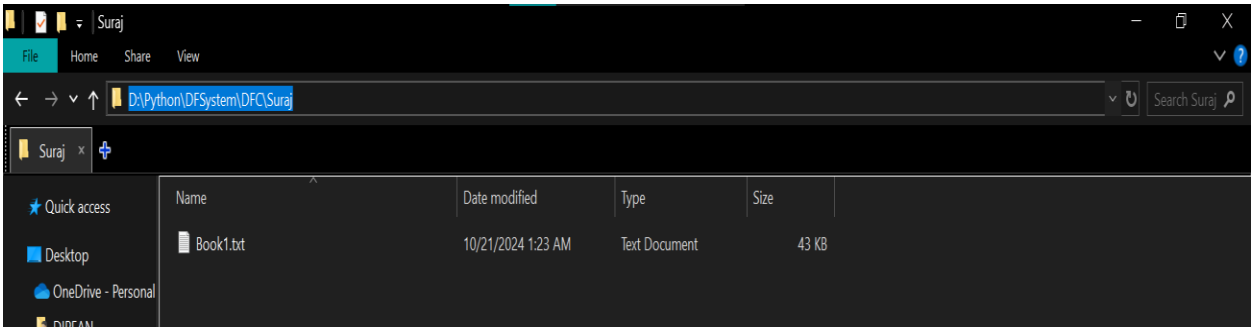


Server 3 and 4





So here we see, after authentication, upon request of file by Suraj, all the 4 servers transferrred the respective chunk of book stored in them. All those were transferred and at the end was reconstructed/ added together and the whole book was saved in the directed folder.



So, it is seen that the requested book was transferred/saved in the user's folder.