

PSG COLLEGE OF TECHNOLOGY
DEPARTMENT OF APPLIED MATHEMATICS AND
COMPUTATIONAL SCIENCES
18XD57 - COMPUTER NETWORKS LAB

TOPIC : FILE TRANSFER IMPLEMENTATION WITH DATA LOSS PREVENTION

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ABSTRACT :

The main objective of this project is to implement huge file transfer using Data loss prevention techniques. Our topic enables uploading and downloading files using sockets and MultiThreading and also prevents loss of data. To implement DLP(data loss prevention) we've implemented password authentication and encryption of files being transferred from server to client. For encryption and decryption we've used the fernet module.

The encrypt and decrypt function on the server and client side is called when the client requests to download a file from the server, the server sends the encrypted version of the file and the decrypt function(client side) is called to decrypt the file contents.

OUTPUT:

1. Password authentication:

CASE 1: Incorrect Password

Client side: When the password typed does not match the password on the server side.

```
In [1]: runfile('C:/Users/swathiprathaa/OneDrive/Desktop/CN_New/Client1/client1.py',
wdir='C:/Users/swathiprathaa/OneDrive/Desktop/CN_New/Client1')

Enter the password :

pswr
Password is incorrect !! Try again later

In [2]:
```

Server side:

```
In [1]: runfile('C:/Users/swathiprathaa/OneDrive/Desktop/CN_New/Server/multiserver.py',
wdir='C:/Users/swathiprathaa/OneDrive/Desktop/CN_New/Server')

Server> Client Requested : ('192.168.0.5', 51730)
Server> Password entered by the client is incorrect!!
```

2. Wrong file requested :

Client side : From the output shown below we can see that when a wrong file name is typed the server checks its list of files and displays the error message.

```
In [1]: runfile('C:/Users/swathiprathaa/OneDrive/Desktop/CN_New/Client1/client1.py', wdir='C:/
Users/swathiprathaa/OneDrive/Desktop/CN_New/Client1')

Enter the password :

pswr123
Connection established successfully with server!!...

What do you want from the server

1.Download File
2.Upload File
Enter an option:1
['Data_Science_Jobs_Salaries.csv', 'encrypt_movie_metadata.csv', 'File1.txt', 'File2.txt',
'key.key', 'marketing_campaign.csv', 'movie_metadata.csv', 'multiserver.py']

Enter Filename to Download from server : filee.txt
```

Server side :

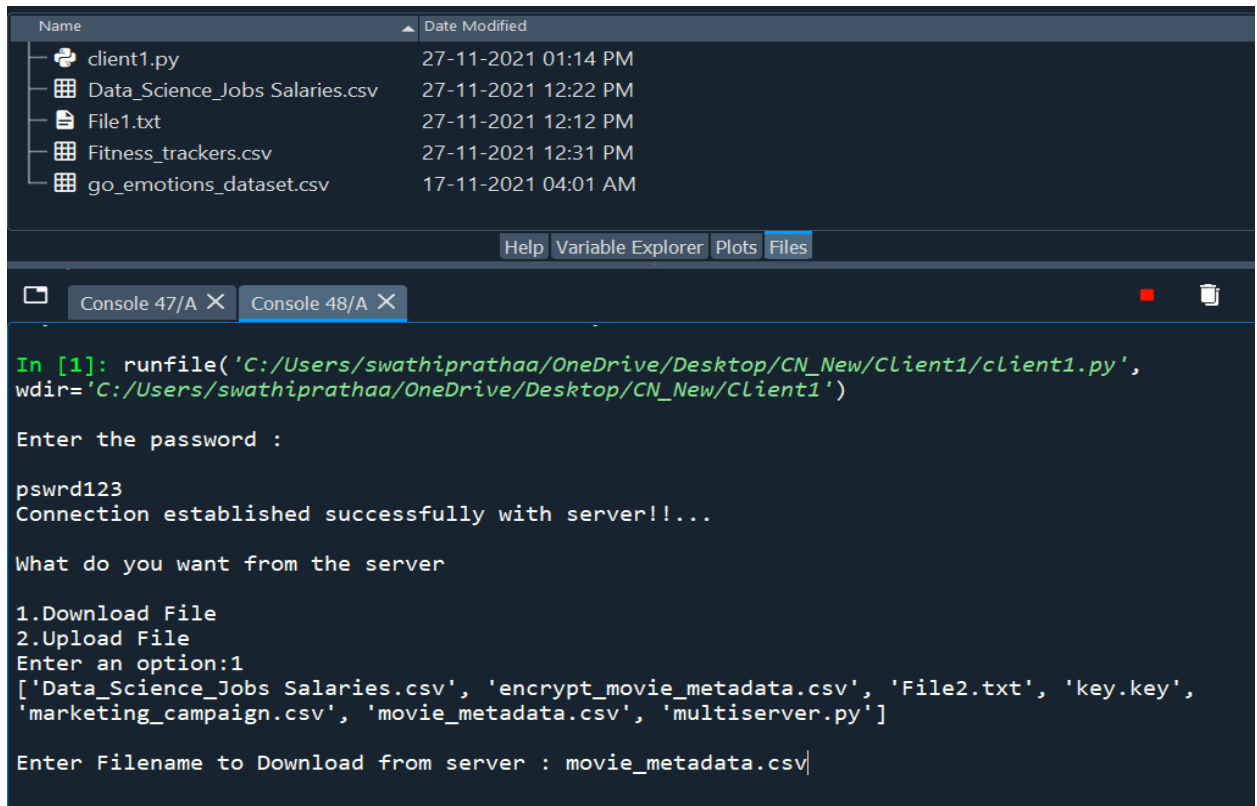
```
In [1]: runfile('C:/Users/swathiprathaa/OneDrive/Desktop/CN_New/Server/multiserver.py', wdir='C:/
Users/swathiprathaa/OneDrive/Desktop/CN_New/Server')

Server> Client Requested : ('192.168.43.48', 52216)
Password is correct !! Connection established with the client
['Data_Science_Jobs_Salaries.csv', 'encrypt_movie_metadata.csv', 'File1.txt', 'File2.txt',
'key.key', 'marketing_campaign.csv', 'movie_metadata.csv', 'multiserver.py']

Server> Client wants to download : b'filee.txt'
Server> Checking the list of files ...
Server> File Not Found in the Server!!
```

3. Download file:

Client side : The client requests a file from the list of files displayed from the server side. If an unknown file is requested the server prints an error message. From the output we can see that the client has no movie_metadata.csv. After the download is completed the client has a copy of the file decrypted.



The screenshot shows a Jupyter Notebook interface. The top panel is a file explorer with two columns: 'Name' and 'Date Modified'. It lists several files: client1.py, Data_Science_Jobs Salaries.csv, File1.txt, Fitness_trackers.csv, and go_emotions_dataset.csv. The bottom panel is a console window with two tabs: 'Console 47/A' and 'Console 48/A'. The console output shows the execution of a runfile command, followed by a password prompt (pswr123), a success message, and a menu of options. The user selects option 1 (Download File) and enters 'movie_metadata.csv' as the filename to download.

Name	Date Modified
client1.py	27-11-2021 01:14 PM
Data_Science_Jobs Salaries.csv	27-11-2021 12:22 PM
File1.txt	27-11-2021 12:12 PM
Fitness_trackers.csv	27-11-2021 12:31 PM
go_emotions_dataset.csv	17-11-2021 04:01 AM

```
In [1]: runfile('C:/Users/swathiprathaa/OneDrive/Desktop/CN_New/Client1/client1.py',
wdir='C:/Users/swathiprathaa/OneDrive/Desktop/CN_New/Client1')

Enter the password :
pswr123
Connection established successfully with server!!...

What do you want from the server


1.Download File
2.Upload File
Enter an option:1
['Data_Science_Jobs Salaries.csv', 'encrypt_movie_metadata.csv', 'File2.txt', 'key.key',
'marketing_campaign.csv', 'movie_metadata.csv', 'multiserver.py']

Enter Filename to Download from server : movie_metadata.csv|
```


Server side : At the server side we can see the progress bar getting updated each time a portion of the file is sent. When the entire file has been sent the progress bar changes to 100%

```
In [1]: runfile('C:/Users/swathiprathaa/OneDrive/Desktop/CN_New/Server/multiserver.py',
wdir='C:/Users/swathiprathaa/OneDrive/Desktop/CN_New/Server')


Server> Client Requested : ('192.168.0.5', 51349)
Password is correct !! Connection established with the client
['Data_Science_Jobs Salaries.csv', 'encrypt_movie_metadata.csv', 'File2.txt', 'key.key',
'marketing_campaign.csv', 'movie_metadata.csv', 'multiserver.py']

Server> Client wants to download : b'movie_metadata.csv'
Server> Checking the list of files ...
Server> File Found in the Server!!
Encrypting and sending!!!
Please wait for few seconds.
Sending movie_metadata.csv: 42% | 606k/1.42M [00:02<00:02, 370kB/s]
```


```
Server> Client Requested : ('192.168.0.5', 51349)
Password is correct !! Connection established with the client
['Data_Science_Jobs Salaries.csv', 'encrypt_movie_metadata.csv', 'File2.txt', 'key.key',
'marketing_campaign.csv', 'movie_metadata.csv', 'multiserver.py']

Server> Client wants to download : b'movie_metadata.csv'
Server> Checking the list of files ...
Server> File Found in the Server!!
Encrypting and sending!!!
Please wait for few seconds.
Sending movie_metadata.csv: 66% | 965k/1.42M [00:03<00:01, 349kB/s]
```

```
Server> Client Requested : ('192.168.0.5', 51349)
Password is correct !! Connection established with the client
['Data_Science_Jobs Salaries.csv', 'encrypt_movie_metadata.csv', 'File2.txt', 'key.key',
'marketing_campaign.csv', 'movie_metadata.csv', 'multiserver.py']

Server> Client wants to download : b'movie_metadata.csv'
Server> Checking the list of files ...
Server> File Found in the Server!!
Encrypting and sending!!!
Please wait for few seconds.
Sending movie_metadata.csv: 94% | 1.33M/1.42M [00:04<00:00, 343kB/s]
```

```
Server> Client Requested : ('192.168.0.5', 51349)
Password is correct !! Connection established with the client
['Data_Science_Jobs Salaries.csv', 'encrypt_movie_metadata.csv', 'File2.txt', 'key.key',
'marketing_campaign.csv', 'movie_metadata.csv', 'multiserver.py']

Server> Client wants to download : b'movie_metadata.csv'
Server> Checking the list of files ...
Server> File Found in the Server!!
Encrypting and sending!!!
Please wait for few seconds.
Sending movie_metadata.csv: 100% | 1.42M/1.42M [00:04<00:00, 327kB/s]

Server> File Sent Successfully!!
```

Name	Date Modified
Client1	27-11-2021 01:33 PM
client1.py	27-11-2021 01:14 PM
Data_Science_Jobs_Salaries.csv	27-11-2021 12:22 PM
File1.txt	27-11-2021 12:12 PM
Fitness_trackers.csv	27-11-2021 12:31 PM
go_emotions_dataset.csv	17-11-2021 04:01 AM
movie_metadata.csv	27-11-2021 01:33 PM
t_key.key	27-11-2021 01:33 PM
Client2	27-11-2021 12:34 PM
Server	27-11-2021 01:31 PM
Data_Science_Jobs_Salaries.csv	27-11-2021 12:44 PM
encrypt_movie_metadata.csv	27-11-2021 01:27 PM
File1.txt	27-11-2021 01:31 PM
File2.txt	27-11-2021 12:15 PM
key.key	27-11-2021 01:27 PM
marketing_campaign.csv	27-11-2021 12:31 PM
movie_metadata.csv	25-11-2021 11:59 AM
multiserver.py	27-11-2021 01:15 PM

4.Upload files :

Client side : The client chooses the file it wants to upload to the server from the list of files displayed on the client side.

The top part of the image shows a file explorer window with a tree view containing folders 'Client2' and 'Server'. The 'Server' folder is expanded, showing files: 'Data_Science_Jobs Salaries.csv', 'encrypt_movie_metadata.csv', 'File2.txt', 'key.key', 'marketing_campaign.csv', 'movie_metadata.csv', and 'multiserver.py'. The bottom part shows a console window with two tabs: 'Console 51/A' and 'Console 52/A'. The active tab 'Console 52/A' displays the output of a Python script. The script prompts for a password, which is 'pswrd123'. It then lists options: '1.Download File' and '2.Upload File'. The user enters '2'. The script then lists available files for upload: 'client1.py', 'Data_Science_Jobs Salaries.csv', 'File1.txt', 'Fitness_trackers.csv', 'go_emotions_dataset.csv', 'movie_metadata.csv', and 't_key.key'. The user enters 'File1.txt'.

```
Name Date Modified
> Client2 27-11-2021 12:34 PM
> Server 27-11-2021 01:20 PM
  Data_Science_Jobs Salaries.csv 27-11-2021 12:44 PM
  encrypt_movie_metadata.csv 27-11-2021 01:17 PM
  File2.txt 27-11-2021 12:15 PM
  key.key 27-11-2021 01:20 PM
  marketing_campaign.csv 27-11-2021 12:31 PM
  movie_metadata.csv 25-11-2021 11:59 AM
  multiserver.py 27-11-2021 01:15 PM

Help Variable Explorer Plots Files

Console 51/A X Console 52/A X
In [1]: runfile('C:/Users/swathiprathaa/OneDrive/Desktop/CN_New/Client1/client1.py',
wdir='C:/Users/swathiprathaa/OneDrive/Desktop/CN_New/Client1')

Enter the password :
pswrd123
Connection established successfully with server!!...

What do you want from the server
1.Download File
2.Upload File
Enter an option:2
['client1.py', 'Data_Science_Jobs Salaries.csv', 'File1.txt', 'Fitness_trackers.csv',
'go_emotions_dataset.csv', 'movie_metadata.csv', 't_key.key']
Enter Filename to Upload On server : File1.txt
```

Server side:After receiving a file from the client.

The top part of the image shows a file explorer window with a tree view containing folders 'Client2' and 'Server'. The 'Server' folder is expanded, showing files: 'Data_Science_Jobs Salaries.csv', 'encrypt_movie_metadata.csv', 'File1.txt', 'File2.txt', 'key.key', 'marketing_campaign.csv', 'movie_metadata.csv', and 'multiserver.py'. The 'File1.txt' file is highlighted with a blue circle. The bottom part shows a console window with two tabs: 'Console 51/A' and 'Console 52/A'. The active tab 'Console 52/A' displays the output of a Python script. The script prompts for a password, which is 'pswrd123'. It then lists options: '1.Download File' and '2.Upload File'. The user enters '2'. The script then lists available files for upload: 'client1.py', 'Data_Science_Jobs Salaries.csv', 'File1.txt', 'Fitness_trackers.csv', 'go_emotions_dataset.csv', 'movie_metadata.csv', and 't_key.key'. The user enters 'File1.txt'.

```
Name Date Modified
> Client2 27-11-2021 12:34 PM
> Server 27-11-2021 01:31 PM
  Data_Science_Jobs Salaries.csv 27-11-2021 12:44 PM
  encrypt_movie_metadata.csv 27-11-2021 01:27 PM
  File1.txt 27-11-2021 01:31 PM
  File2.txt 27-11-2021 12:15 PM
  key.key 27-11-2021 01:27 PM
  marketing_campaign.csv 27-11-2021 12:31 PM
  movie_metadata.csv 25-11-2021 11:59 AM
  multiserver.py 27-11-2021 01:15 PM

Help Variable Explorer Plots Files

Console 51/A X Console 52/A X
Python 3.8.8 (default, Apr 13 2021, 15:08:03) [MSC v.1916 64 bit (AMD64)]
Type "copyright", "credits" or "license" for more information.

IPython 7.29.0 -- An enhanced Interactive Python.

In [1]: runfile('C:/Users/swathiprathaa/OneDrive/Desktop/CN_New/Server/multiserver.py',
wdir='C:/Users/swathiprathaa/OneDrive/Desktop/CN_New/Server')

Server> Client Requested : ('192.168.0.5', 51546)
Password is correct !! Connection established with the client
Server> Client wants to upload : b'File1.txt'

Server> Enter the number of bytes to be sent: 5000
Server> Receiving File...
Server> File Received Successfully!!
```

5. Multiclients :

SERVER:

```
In [1]: runfile('C:/Users/swathiprathaa/OneDrive/Desktop/CN_New/Server/multiserver.py', wdir='C:/Users/swathiprathaa/OneDrive/Desktop/CN_New/Server')

Server> Client Requested : ('192.168.0.5', 52549)
Password is correct !! Connection established with the client
['Data_Science_Jobs Salaries.csv', 'encrypt_movie_metadata.csv', 'File1.txt', 'File2.txt', 'key.key', 'marketing_campaign.csv', 'movie_metadata.csv', 'multiserver.py']

Server> Client wants to download : b'File1.txt'
Server> Checking the list of files ...
Server> File Found in the Server!!
Encrypting and sending!!!
Please wait for few seconds.
Sending File1.txt: 100%|██████████| 3.07k/3.07k [00:00<00:00, 129kB/s]
Server> File Sent Successfully!!

Server> Client Requested : ('192.168.0.5', 52557)
Password is correct !! Connection established with the client
['Data_Science_Jobs Salaries.csv', 'encrypt_File1.txt', 'encrypt_movie_metadata.csv', 'File1.txt', 'File2.txt', 'key.key', 'marketing_campaign.csv', 'movie_metadata.csv', 'multiserver.py']

Server> Client wants to download : b'File2.txt'
Server> Checking the list of files ...
Server> File Found in the Server!!
Encrypting and sending!!!
Please wait for few seconds.
Sending File2.txt: 100%|██████████| 2.62k/2.62k [00:00<00:00, 109kB/s]
Server> File Sent Successfully!!
```

CLIENT 1:

```
In [1]: runfile('C:/Users/swathiprathaa/OneDrive/Desktop/CN_New/Client1/client1.py', wdir='C:/Users/swathiprathaa/OneDrive/Desktop/CN_New/Client1')

Enter the password :
pswrd123
Connection established successfully with server!!...

What do you want from the server
1.Download File
2.Upload File
Enter an option:1
['Data_Science_Jobs Salaries.csv', 'encrypt_movie_metadata.csv', 'File1.txt', 'File2.txt', 'key.key', 'marketing_campaign.csv', 'movie_metadata.csv', 'multiserver.py']

Enter Filename to Download from server : File1.txt

File recieved sent for decrypting....
Decrypting...
Finished

In [2]:
```

CLIENT 2:

```
In [1]: runfile('C:/Users/swathiprathaa/OneDrive/Desktop/CN_New/Client2/client2.py', wdir='C:/Users/swathiprathaa/OneDrive/Desktop/CN_New/Client2')

Enter the password :
pswr123
Connection established successfully with server!!...

What do you want from the server
1.Download File
2.Upload File
Enter an option:1
['Data_Science_Jobs Salaries.csv', 'encrypt_File1.txt', 'encrypt_movie_metadata.csv', 'File1.txt', 'File2.txt', 'key.key', 'marketing_campaign.csv', 'movie_metadata.csv', 'multiserver.py']

Enter Filename to Download from server : File2.txt

File recieved sent for decrypting.....
Decrypting...
Finished

In [2]:
```

TO RUN :

ANY IDE CAN BE USED TO RUN OUR PACKAGE.

WE'VE USED SPYDER.

RUN SERVER.PY

THEN RUN CLIENT1.PY

FOR MULTICLIENTS OPEN A NEW CONSOLE AND RUN THE SAME CLIENT1 AGAIN OR RUN ANOTHER CLIENT FILE(CLIENT 2).