Distributed File Transfer

Team Name: Hackers Alert

8th September 2023

1 Members

Voora Akash (2021CS10104)
Somu Hitesh (2021CS10568)
Kethavath Ajay Kumar (2021CS11211)
Dase Chaitraja (2021CS10580)

2 Distributed algorithm for P2P exchange:

- We used socket module in python to connect to vayu server and also for P2P connections.
- One of the clients of our team is the master, who would act as a connecting member for all other clients.
- Thus, we established one connection from master to each of the other clients, and one connection to vayu server from every client (including master).
- All the clients start requesting lines from the vayu server and store those lines on their devices in a hashmap, and send only line numbers to master.
- Master would also store line numbers in a set sent by each client seperately.
- Once master receives all the line numbers (1000), master would send a signal to all the clients to stop sending line requests to vayu server. Thus, the clients break their loops which involve requesting lines from vayu server.
- Now that the master knows the line numbers of the lines that each client has, he would request all other clients to send their lines which are not currently present with the master.
- Master has now downloaded the file i.e., he has all the 1000 unique lines with him now.
- As the master knows the lines present with each client, he would send all the remaining lines each client requires.
- Now that everyone has all the lines, each of them will submit to the vayu server.

Does the download time reduce linearly as you add more and more clients?

The Download speed does not decrease linearly it rapidly decreases from one client to 2 client and then it decreases slowly.

Also report various exception scenarios you handle, for example, if a client node in your P2P network suddenly dies and wants to reconnect, or if a client-server connection breaks and the client reconnects, etc.

Upon sending a sendline request to vayu, we noticed that sometimes, vayu is sending back only a part of the line. So we incorporated a loop to repeatedly receive packets from vayu until the end of the line ("\n") is reached. So, we eventually get whole line.

3 Graphs

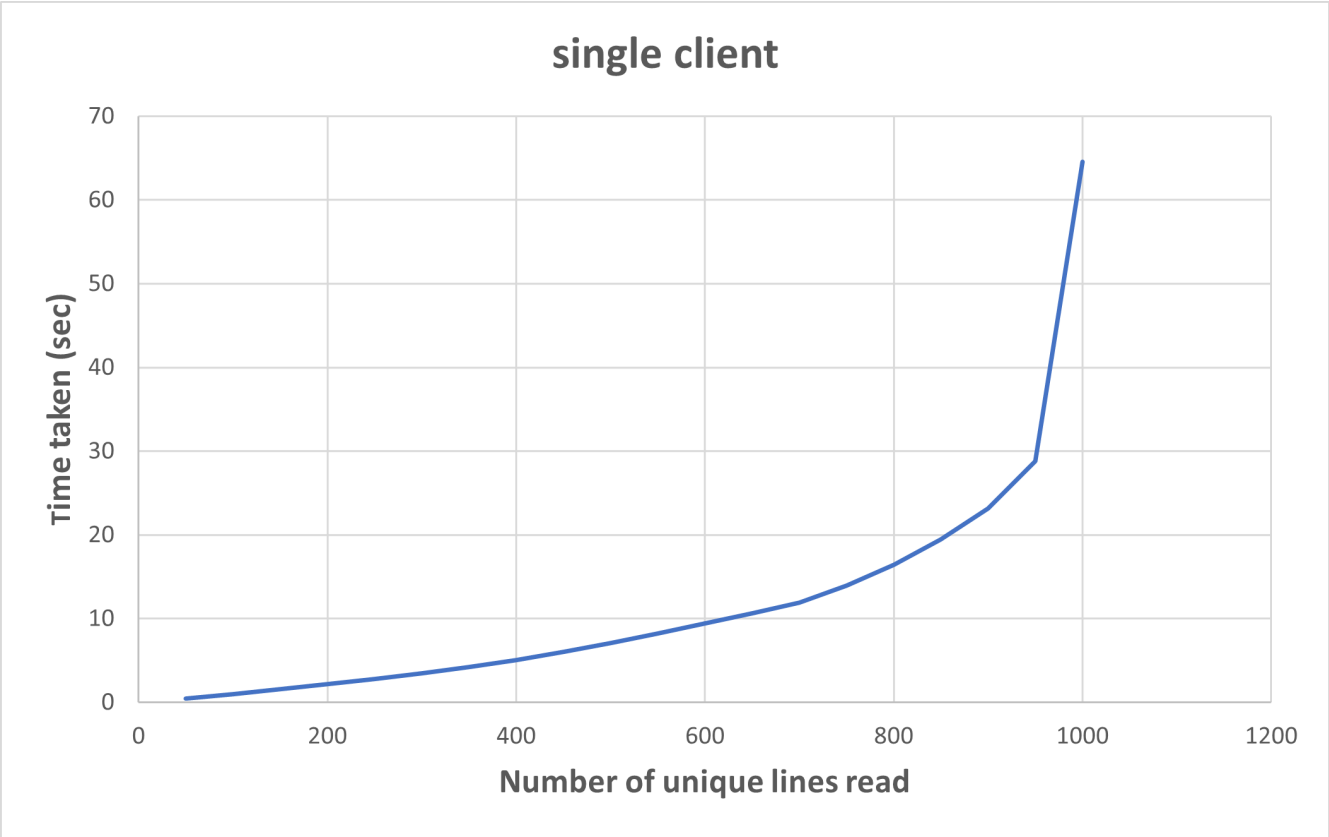

Figure 1: `Single client`

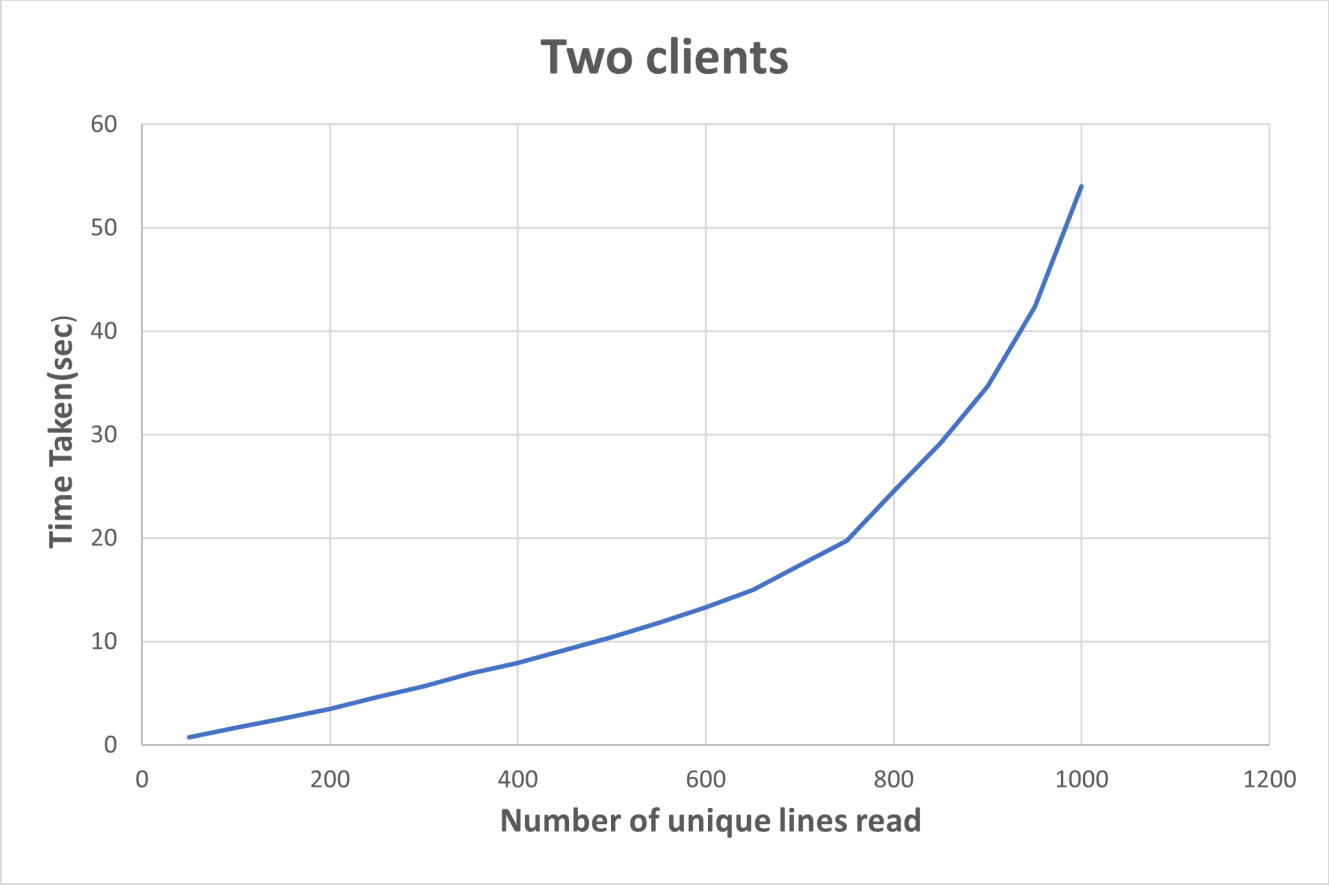

Figure 2: `Two clients`

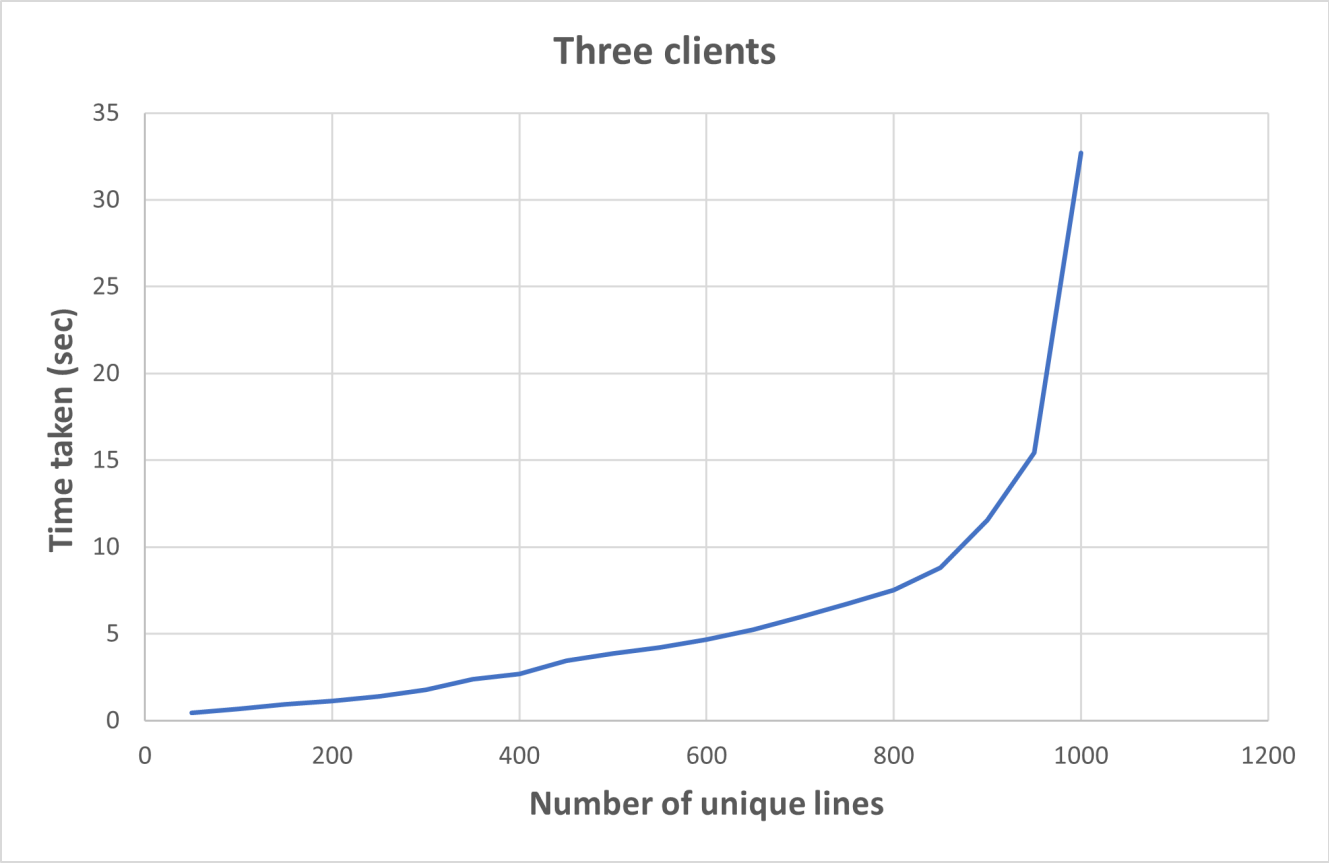

Figure 3: `Three clients`

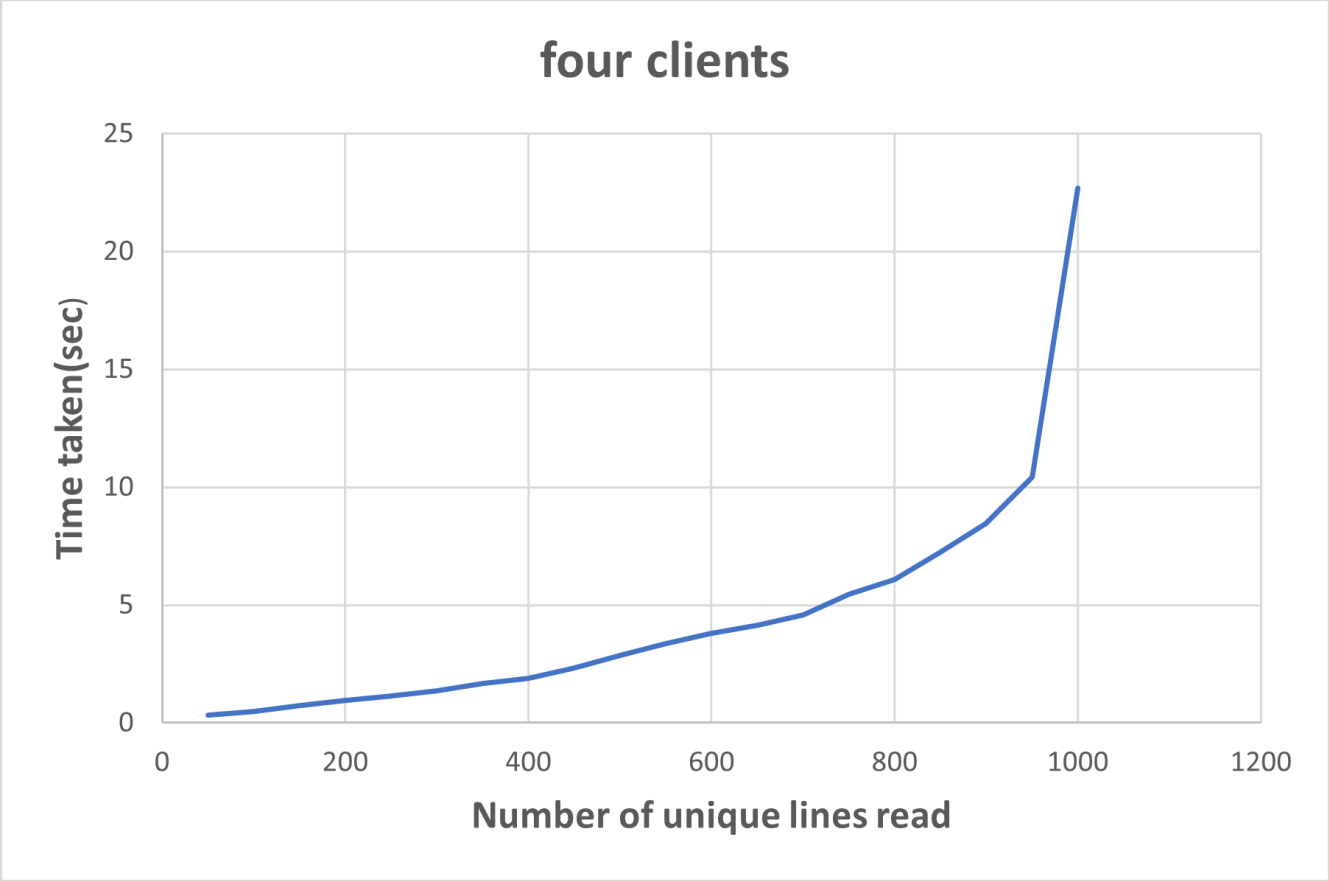

Figure 4: `Four clients`

```
akash@akash-HP-Pavilion-Gaming-Laptop-15-dk2xxx:~/Desktop/col333/A1/starter_code$ /bin/python3 /home/akash/Desktop/col3334/one_client.py
connected to 3 sercers
time taken for  50 lines is  0.48412656784057617
time taken for  100 lines is  1.0148510932922363
time taken for  150 lines is  1.6132478713989258
time taken for  200 lines is  2.2141287326812744
time taken for  250 lines is  2.7739813327789307
time taken for  300 lines is  3.4753482341766357
time taken for  350 lines is  4.193544626235962
time taken for  400 lines is  5.074951648712158
time taken for  450 lines is  6.024408578872681
time taken for  500 lines is  7.104909181594849
time taken for  550 lines is  8.194559574127197
time taken for  600 lines is  9.443433046340942
time taken for  650 lines is  10.603641748428345
time taken for  700 lines is  11.92550802230835
time taken for  750 lines is  13.947693586349487
time taken for  800 lines is  16.432937622070312
time taken for  850 lines is  19.44423747062683
time taken for  900 lines is  23.115540981292725
time taken for  950 lines is  28.794090270996094
time taken for  1000 lines is  64.57147574424744
loop1 over
loop4 over
submitted to vayu
master submit time =  73.37939047813416
time taken to receive from remaining lines  2.384185791015625e-07
total time taken =  73.37939357757568
SUBMIT SUCCESS: cs1210568@hackers alert - 10.194.2.52 - 1000, 0, 1000, 34957, 7335, 1000 - 1694174535781, 1694181559891, 1694181633232
```

Figure 5: `Screenshot for one client`

```
ConnectionRefusedError: [Errno 111] Connection refused
akash@akash-HP-Pavilion-Gaming-Laptop-15-dk2xxx:~/Desktop/col333/A1/starter_code$ /bin/python3 /home/akash/Desktop/col3334/two_client.py
connected to 3 sercers
time taken for  50 lines is  0.7721805572509766
time taken for  100 lines is  1.6562535762786865
time taken for  150 lines is  2.5500736236572266
time taken for  200 lines is  3.5107805728912354
time taken for  250 lines is  4.6360533237457275
time taken for  300 lines is  5.698852062225342
time taken for  350 lines is  6.956938743591309
time taken for  400 lines is  7.970277547836304
time taken for  450 lines is  9.187391519546509
time taken for  500 lines is  10.42704725265503
time taken for  550 lines is  11.815439701080322
time taken for  600 lines is  13.327363967895508
time taken for  650 lines is  15.029618740081787
time taken for  700 lines is  17.370604038238525
time taken for  750 lines is  19.751598596572876
time taken for  800 lines is  24.600219726562 5
time taken for  850 lines is  29.220028400421143
time taken for  900 lines is  34.67312169075012
time taken for  950 lines is  42.4003381729126
loop1 over
receiving ajay
loop4 over
submitted to vayu

master submit time =  56.26079821586609
time taken to receive from remaining lines  0.10043525695800781
total time taken =  56.341840505599976
SUBMIT SUCCESS: cs1210568@hackers alert - 10.194.2.52 - 1000, 0, 1000, 42384, 3989, 1000 - 1694174535781, 1694181894503, 1694181950609
```

Figure 6: Screenshot for two clients

```
akash@akash-HP-Pavilion-Gaming-Laptop-15-dk2xxx:~/Desktop/col333/A1/starter_code$ /bin/python3 /home/akash/Desktop/col3334/final.py
connected to 3 sercers
time taken for  50 lines is  0.44823479652404785
time taken for  100 lines is  0.6642405986785889
time taken for  150 lines is  0.9271640777587891
time taken for  200 lines is  1.136263132095337
time taken for  250 lines is  1.3960990905761719
time taken for  300 lines is  1.7727646827697754
time taken for  350 lines is  2.3707191944122314
time taken for  400 lines is  2.678455114364624
time taken for  450 lines is  3.435025691986084
time taken for  500 lines is  3.8632583618164062
time taken for  550 lines is  4.217881441116333
time taken for  600 lines is  4.662591218948364
time taken for  650 lines is  5.256668329238892
time taken for  700 lines is  5.979337692260742
time taken for  750 lines is  6.704198360443115
time taken for  800 lines is  7.503936052322388
time taken for  850 lines is  8.818100929260254
time taken for  900 lines is  11.555139303207397
time taken for  950 lines is  15.436370372772217
time taken for 1000 lines is   32.70315718650818
loop1 over
receiving ajay
loop4 over
submitted to vayu

master submit time =  35.066702127456665
time taken to receive from remaining lines  2.2998812198638916
total time taken =  40.99191904067993
SUBMIT SUCCESS: cs1210568@hackers alert - 10.194.2.52 - 1000, 0, 1000, 20288, 1684, 1000 - 1694174535781, 1694180696334, 1694180731084
```

Figure 7: Screenshot for three clients

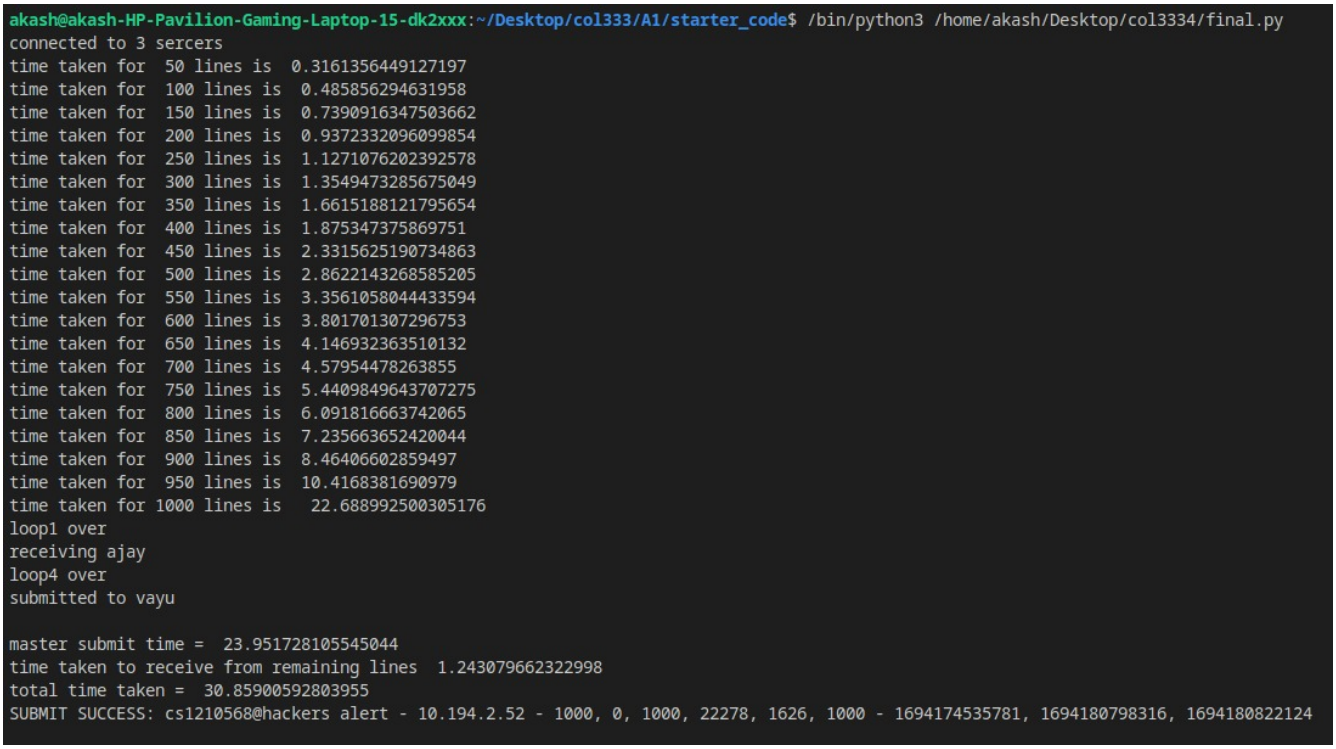

Figure 8: Screenshot for four clients