

Evaluation I

Below evaluation is performed by executing

1 peer

2 peer concurrently

4 peer concurrently

8 peer concurrently

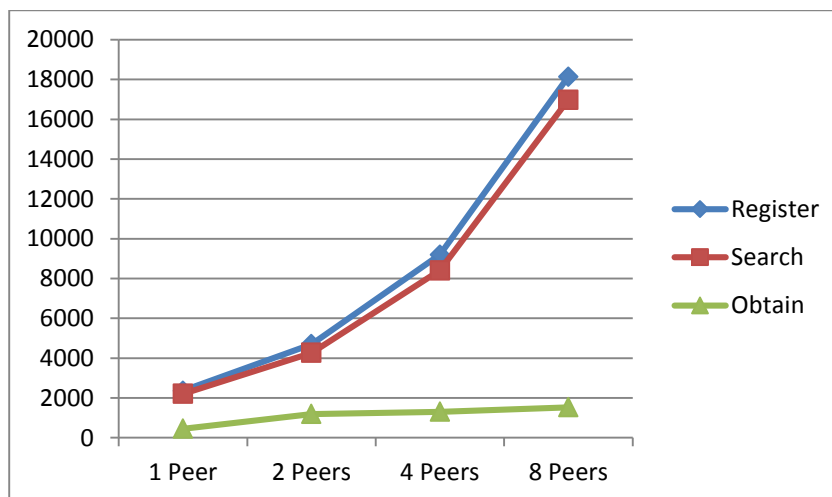
10,000 files processed by each peer of 1kb.

Below is the analysis of evaluation performed:-

File size used for this evaluation is 1KB.

Number of concurrent peers	Register (operations/second)	Search(operations/second)	Obtain(operations/second)
1 Peer	2361	2208	454
2 Peers	4697	4266	1193
4 Peers	9195	8403	1301
8 Peers	18140	16980	1529

System Throughput per second



Analysis on above data (Throughput):-

1 Concurrent peer (throughput required for each operation):-

Register 2361 operations/second

Search 2208 operations/second

Obtain 454 operations/second

8 Concurrent peers (throughputs required for each operation):-

Register 18140 operations/second

Search 16980 operations/second

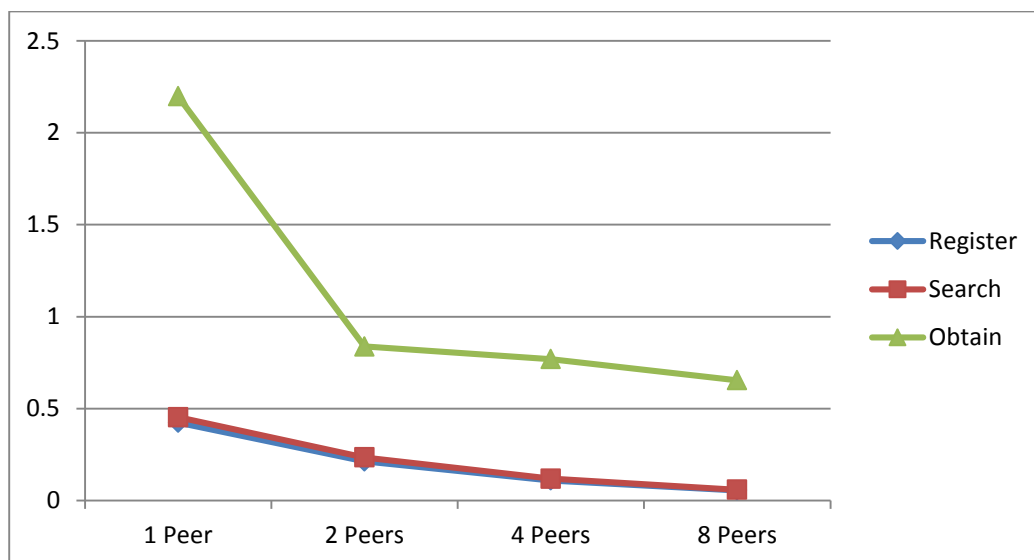
Obtain 1529 operations/second

- By comparing throughputs of 1 concurrent peer and 8 concurrent peers we can say that operations / second increases as concurrent peers go on increasing.
- Register operation is faster as compared to search and obtain operations. Obtain operations throughput is low because it has to send and receive files and involves more overheads as compared to search and register.

Response Time:-

Number of concurrent peers	Register (per operation)	Search(per operation)	Obtain(per operation)
1 Peer	0.423	0.4527	2.198
2 Peers	0.2129	0.2344	0.8381
4 Peers	0.1087	0.119	0.7686
8 Peers	0.0551	0.0588	0.654

Response time per request:-



Analysis on above data (Response time):-

1 Concurrent peer (throughput required for each operation):-

Register 0.423 milliseconds/request

Search 0.4527 milliseconds/request

Obtain 2.198 milliseconds/request

8 Concurrent peer (throughput required for each operation):-

Register 0.0551 milliseconds/request

Search 0.0588 milliseconds/request

Obtain 0.654 milliseconds/request

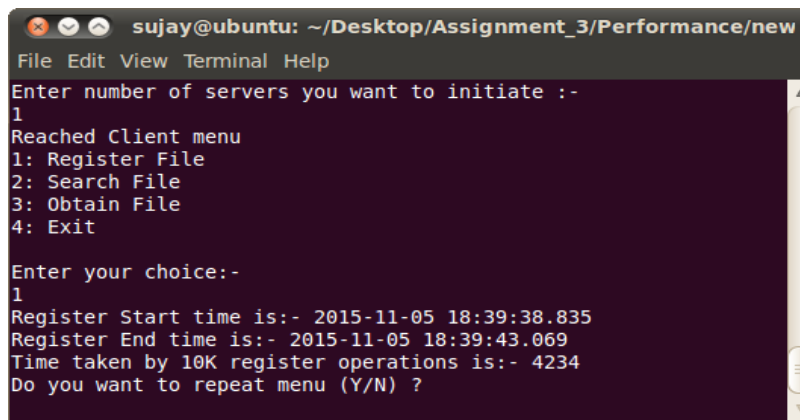
- By comparing throughputs of 1 concurrent peer and 8 concurrent peers we can say that response time per operation request decreases as concurrent peers go on increasing.
- Register operation response time is low as compared to search and obtain operations. Obtain operations response time is high because it has to send and receive files and involves more overheads as compared to search and register.

Below are the screenshots of evaluation.

Distributed Systems

1 Peer :-

Register Operation:-

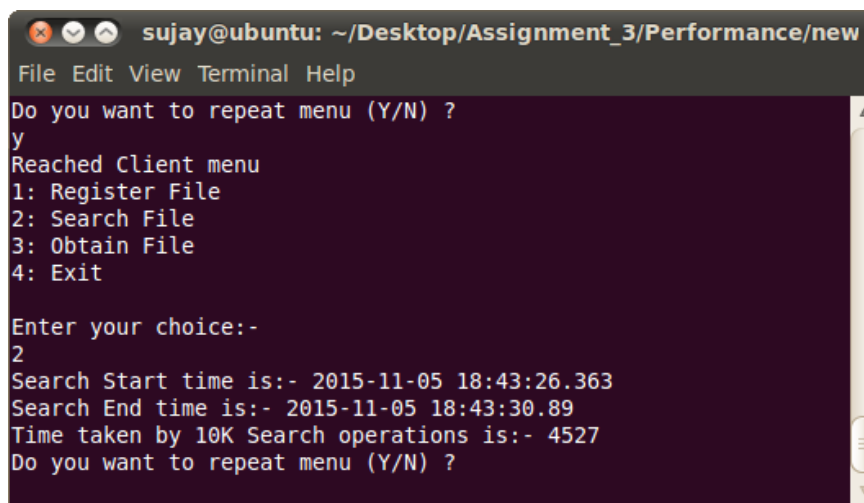
A terminal window titled 'sujay@ubuntu: ~/Desktop/Assignment_3/Performance/new' showing the output of a 'Register' operation. The user enters '1' for the number of servers and '1' for the choice. The terminal displays the start and end times, the time taken by 10K register operations (4234), and asks if the user wants to repeat the menu.

```
sujay@ubuntu: ~/Desktop/Assignment_3/Performance/new
File Edit View Terminal Help
Enter number of servers you want to initiate :-
1
Reached Client menu
1: Register File
2: Search File
3: Obtain File
4: Exit
Enter your choice:-
1
Register Start time is:- 2015-11-05 18:39:38.835
Register End time is:- 2015-11-05 18:39:43.069
Time taken by 10K register operations is:- 4234
Do you want to repeat menu (Y/N) ?
```

Throughput 2361.83 operations/second

Response time- 0.423 milliseconds/ request

Search Operation:-

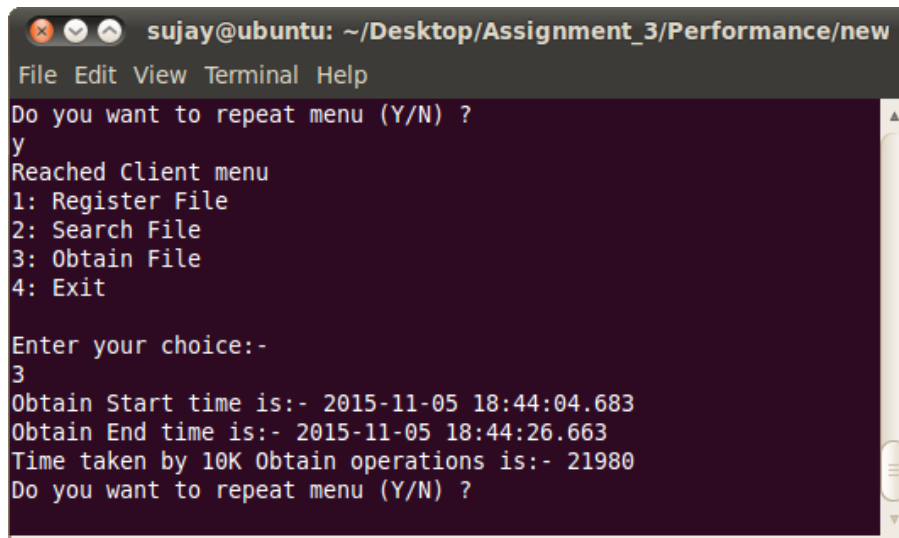
A terminal window titled 'sujay@ubuntu: ~/Desktop/Assignment_3/Performance/new' showing the output of a 'Search' operation. The user enters 'y' to repeat the menu, then '2' for the choice. The terminal displays the start and end times, the time taken by 10K search operations (4527), and asks if the user wants to repeat the menu.

```
sujay@ubuntu: ~/Desktop/Assignment_3/Performance/new
File Edit View Terminal Help
Do you want to repeat menu (Y/N) ?
y
Reached Client menu
1: Register File
2: Search File
3: Obtain File
4: Exit
Enter your choice:-
2
Search Start time is:- 2015-11-05 18:43:26.363
Search End time is:- 2015-11-05 18:43:30.89
Time taken by 10K Search operations is:- 4527
Do you want to repeat menu (Y/N) ?
```

Throughput 2208.96 operations/second

Response time- 0.4527 milliseconds/ request

Obtain Operation:-



```
sujoy@ubuntu: ~/Desktop/Assignment_3/Performance/new
File Edit View Terminal Help
Do you want to repeat menu (Y/N) ?
y
Reached Client menu
1: Register File
2: Search File
3: Obtain File
4: Exit

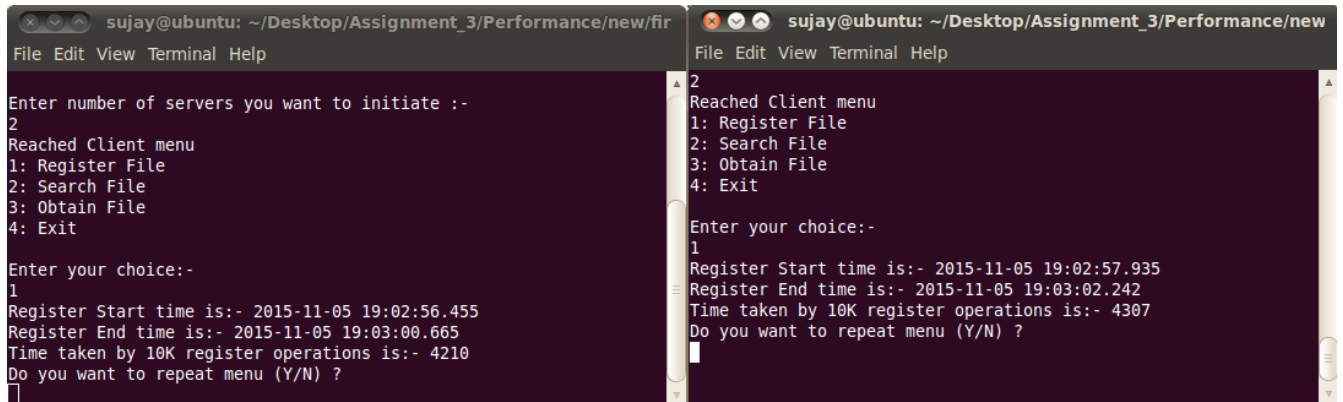
Enter your choice:-
3
Obtain Start time is:- 2015-11-05 18:44:04.683
Obtain End time is:- 2015-11-05 18:44:26.663
Time taken by 10K Obtain operations is:- 21980
Do you want to repeat menu (Y/N) ?
```

Throughput 454.96 operations/second

Response time- 2.198s milliseconds/ request

2 Peers running concurrently:-

Register Operation:-



```
sujoy@ubuntu: ~/Desktop/Assignment_3/Performance/new/fir
File Edit View Terminal Help

Enter number of servers you want to initiate :-
2
Reached Client menu
1: Register File
2: Search File
3: Obtain File
4: Exit

Enter your choice:-
1
Register Start time is:- 2015-11-05 19:02:56.455
Register End time is:- 2015-11-05 19:03:00.665
Time taken by 10K register operations is:- 4210
Do you want to repeat menu (Y/N) ?

sujoy@ubuntu: ~/Desktop/Assignment_3/Performance/new
File Edit View Terminal Help

2
Reached Client menu
1: Register File
2: Search File
3: Obtain File
4: Exit

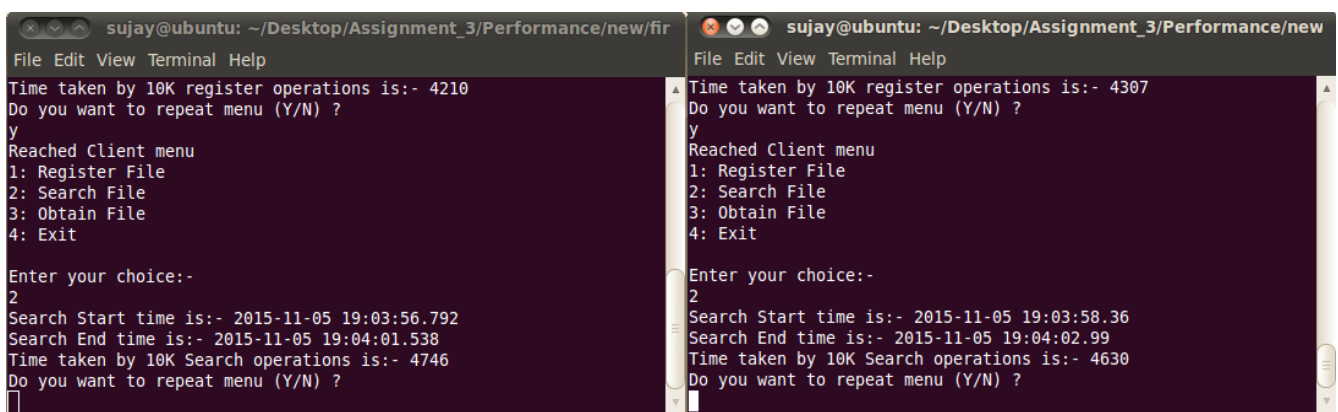
Enter your choice:-
1
Register Start time is:- 2015-11-05 19:02:57.935
Register End time is:- 2015-11-05 19:03:02.242
Time taken by 10K register operations is:- 4307
Do you want to repeat menu (Y/N) ?
```

Time:- 4258.5

Throughput 4697.04 operations/second

Response time- 0.2129 milliseconds/ request

Search Operation:-



```
sujoy@ubuntu: ~/Desktop/Assignment_3/Performance/new/fir
File Edit View Terminal Help

Time taken by 10K register operations is:- 4210
Do you want to repeat menu (Y/N) ?
y
Reached Client menu
1: Register File
2: Search File
3: Obtain File
4: Exit

Enter your choice:-
2
Search Start time is:- 2015-11-05 19:03:56.792
Search End time is:- 2015-11-05 19:04:01.538
Time taken by 10K Search operations is:- 4746
Do you want to repeat menu (Y/N) ?

sujoy@ubuntu: ~/Desktop/Assignment_3/Performance/new
File Edit View Terminal Help

Time taken by 10K register operations is:- 4307
Do you want to repeat menu (Y/N) ?
y
Reached Client menu
1: Register File
2: Search File
3: Obtain File
4: Exit

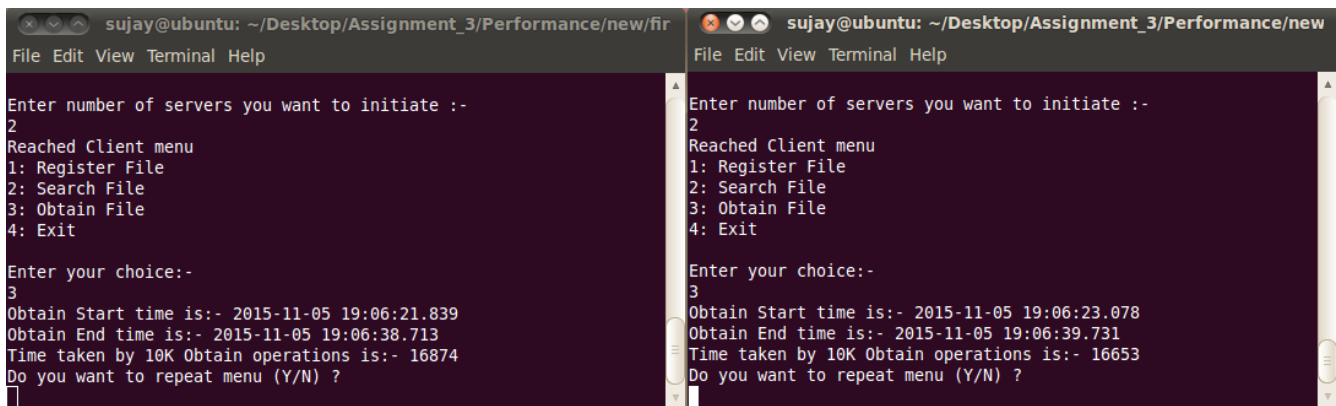
Enter your choice:-
2
Search Start time is:- 2015-11-05 19:03:58.36
Search End time is:- 2015-11-05 19:04:02.99
Time taken by 10K Search operations is:- 4630
Do you want to repeat menu (Y/N) ?
```

Time :- 4688

Throughput 4266.21 operations/second

Response time- 0.2344 milliseconds/ request

Obtain Operation:-



```
sujoy@ubuntu: ~/Desktop/Assignment_3/Performance/new/fir
File Edit View Terminal Help

Enter number of servers you want to initiate :-
2
Reached Client menu
1: Register File
2: Search File
3: Obtain File
4: Exit

Enter your choice:-
3
Obtain Start time is:- 2015-11-05 19:06:21.839
Obtain End time is:- 2015-11-05 19:06:38.713
Time taken by 10K Obtain operations is:- 16874
Do you want to repeat menu (Y/N) ?

sujoy@ubuntu: ~/Desktop/Assignment_3/Performance/new
File Edit View Terminal Help

Enter number of servers you want to initiate :-
2
Reached Client menu
1: Register File
2: Search File
3: Obtain File
4: Exit

Enter your choice:-
3
Obtain Start time is:- 2015-11-05 19:06:23.078
Obtain End time is:- 2015-11-05 19:06:39.731
Time taken by 10K Obtain operations is:- 16653
Do you want to repeat menu (Y/N) ?
```

Time :- 16763

Throughput 1193.10 operations/second

Response time- 0.8381 milliseconds/ request

4 Peers running concurrently:-

Register Operation:-

```
sujoy@ubuntu: ~/Desktop/Assignment_3/Performance/new/fir
File Edit View Terminal Help

Enter number of servers you want to initiate :-
4
Reached Client menu
1: Register File
2: Search File
3: Obtain File
4: Exit

Enter your choice:-
1
Register Start time is:- 2015-11-05 19:21:03.699
Register End time is:- 2015-11-05 19:21:08.043
Time taken by 10K register operations is:- 4344
Do you want to repeat menu (Y/N) ?

sujoy@ubuntu: ~/Desktop/Assignment_3/Performance/new
File Edit View Terminal Help

Enter number of servers you want to initiate :-
4
Reached Client menu
1: Register File
2: Search File
3: Obtain File
4: Exit

Enter your choice:-
1
Register Start time is:- 2015-11-05 19:21:04.951
Register End time is:- 2015-11-05 19:21:09.394
Time taken by 10K register operations is:- 4443
Do you want to repeat menu (Y/N) ?

sujoy@ubuntu: ~/Desktop/Assignment_3/Performance/new/fir
File Edit View Terminal Help

Enter number of servers you want to initiate :-
4
Reached Client menu
1: Register File
2: Search File
3: Obtain File
4: Exit

Enter your choice:-
1
Register Start time is:- 2015-11-05 19:21:07.419
Register End time is:- 2015-11-05 19:21:11.719
Time taken by 10K register operations is:- 4300
Do you want to repeat menu (Y/N) ?

sujoy@ubuntu: ~/Desktop/Assignment_3/Performance/new
File Edit View Terminal Help

Enter number of servers you want to initiate :-
4
Reached Client menu
1: Register File
2: Search File
3: Obtain File
4: Exit

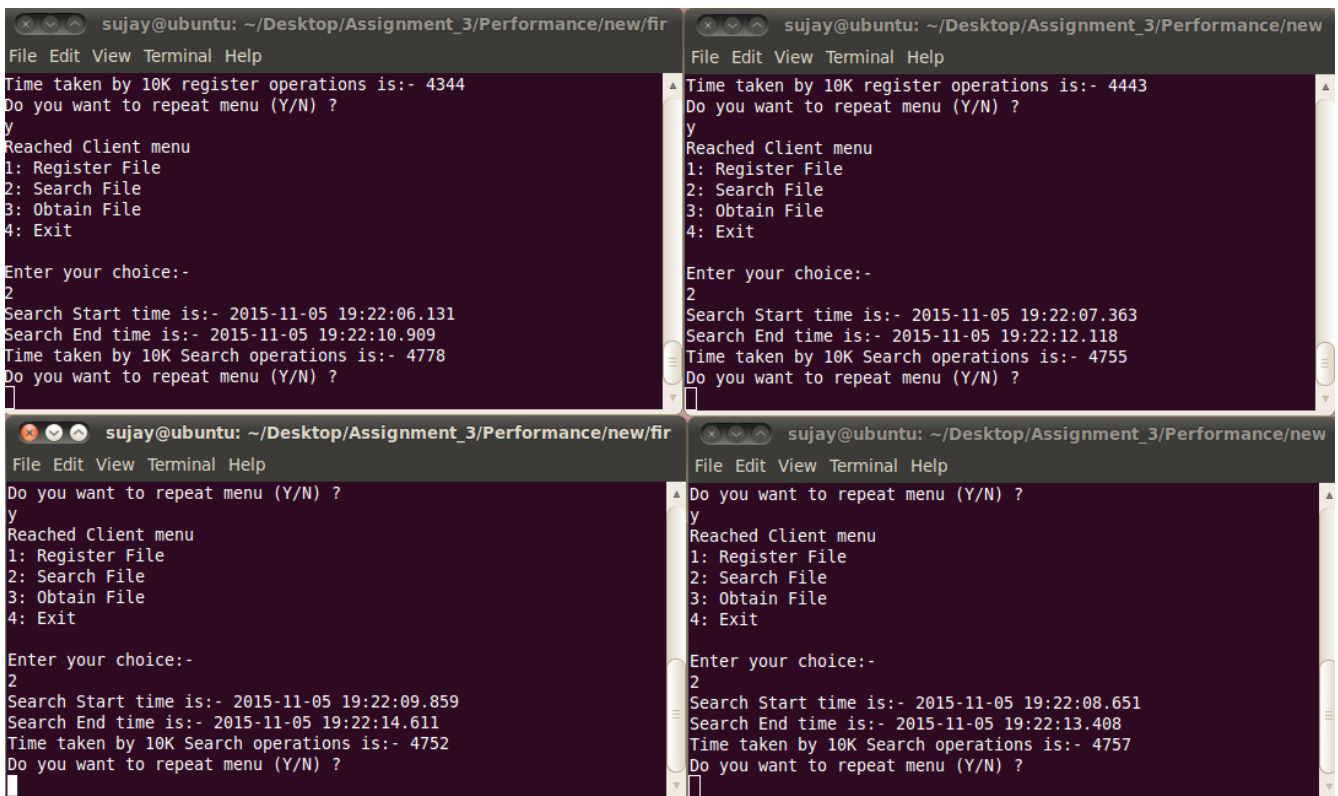
Enter your choice:-
1
Register Start time is:- 2015-11-05 19:21:06.207
Register End time is:- 2015-11-05 19:21:10.521
Time taken by 10K register operations is:- 4314
Do you want to repeat menu (Y/N) ?
```

Time :- 4350

Throughput 9195.40 operations/second

Response time- 0.1087 milliseconds/ request

Search Operation:-



The image displays four terminal windows arranged in a 2x2 grid, each showing the output of a search operation. The terminals are titled 'sujay@ubuntu: ~/Desktop/Assignment_3/Performance/new/fir' and 'sujay@ubuntu: ~/Desktop/Assignment_3/Performance/new'. Each window shows a menu with options: 1: Register File, 2: Search File, 3: Obtain File, 4: Exit. The user selects option 2 (Search File). The output for each search operation includes the start and end times, the time taken by 10K search operations, and a prompt to repeat the menu (Y/N). The results are as follows:

Terminal	Search Start time	Search End time	Time taken by 10K Search operations
Top Left	2015-11-05 19:22:06.131	2015-11-05 19:22:10.909	4778
Top Right	2015-11-05 19:22:07.363	2015-11-05 19:22:12.118	4755
Bottom Left	2015-11-05 19:22:09.859	2015-11-05 19:22:14.611	4752
Bottom Right	2015-11-05 19:22:08.651	2015-11-05 19:22:13.408	4757

Time :- 4760

Throughput 8403.36 operations/second

Response time- 0.119 milliseconds/ request

Obtain Operation:-

```
sujoy@ubuntu: ~/Desktop/Assignment_3/Performance/new/fir
File Edit View Terminal Help
Time taken by 10K Search operations is:- 4778
Do you want to repeat menu (Y/N) ?
y
Reached Client menu
1: Register File
2: Search File
3: Obtain File
4: Exit
Enter your choice:-
3
Obtain Start time is:- 2015-11-05 19:22:49.921
Obtain End time is:- 2015-11-05 19:23:18.605
Time taken by 10K Obtain operations is:- 28684
Do you want to repeat menu (Y/N) ?
y

sujoy@ubuntu: ~/Desktop/Assignment_3/Performance/new
File Edit View Terminal Help
Time taken by 10K Search operations is:- 4755
Do you want to repeat menu (Y/N) ?
y
Reached Client menu
1: Register File
2: Search File
3: Obtain File
4: Exit
Enter your choice:-
3
Obtain Start time is:- 2015-11-05 19:22:51.28
Obtain End time is:- 2015-11-05 19:23:22.675
Time taken by 10K Obtain operations is:- 31395
Do you want to repeat menu (Y/N) ?
y

sujoy@ubuntu: ~/Desktop/Assignment_3/Performance/new/fir
File Edit View Terminal Help
Do you want to repeat menu (Y/N) ?
y
Reached Client menu
1: Register File
2: Search File
3: Obtain File
4: Exit
Enter your choice:-
3
Obtain Start time is:- 2015-11-05 19:22:53.715
Obtain End time is:- 2015-11-05 19:23:24.99
Time taken by 10K Obtain operations is:- 31275
Do you want to repeat menu (Y/N) ?
y

sujoy@ubuntu: ~/Desktop/Assignment_3/Performance/new
File Edit View Terminal Help
Do you want to repeat menu (Y/N) ?
y
Reached Client menu
1: Register File
2: Search File
3: Obtain File
4: Exit
Enter your choice:-
3
Obtain Start time is:- 2015-11-05 19:22:52.499
Obtain End time is:- 2015-11-05 19:23:24.124
Time taken by 10K Obtain operations is:- 31625
Do you want to repeat menu (Y/N) ?
y
```

Time :- 30744

Throughput 1301.06 operations/second

Response time- 0.7686 milliseconds/ request

8 Peers running concurrently:-

Register Operation:-

Time :- 4410

Throughput 18140 operations/second

Response time- 0.0551 milliseconds/ request

The screenshot displays four terminal windows, each representing a peer's execution of the Register Operation. Each window shows a menu with options: 1: Register File, 2: Search File, 3: Obtain File, and 4: Exit. The user selects option 1. The output for each peer includes the start and end times, the time taken by 10K register operations, and a prompt to repeat the menu. The results are as follows:

Peer	Start Time	End Time	Time taken by 10K register operations
1	20:03:51.855	20:03:56.313	4458
2	20:03:51.855	20:03:56.313	4458
3	20:03:51.855	20:03:56.313	4458
4	20:03:51.855	20:03:56.313	4458

Search Operation:-

The screenshot displays four terminal windows, each representing a peer's execution of the Search Operation. Each window shows a menu with options: 1: Register File, 2: Search File, 3: Obtain File, and 4: Exit. The user selects option 2. The output for each peer includes the start and end times, the time taken by 10K search operations, and a prompt to repeat the menu. The results are as follows:

Peer	Start Time	End Time	Time taken by 10K Search operations
1	20:06:44.532	20:06:49.138	4606
2	20:06:44.532	20:06:49.138	4606
3	20:06:44.532	20:06:49.138	4606
4	20:06:44.532	20:06:49.138	4606

Time :- 4709

Throughput 16988 operations/second

Response time- 0.0588 milliseconds/ request

Obtain Operation:-

```
sujoy@ubuntu: ~/Desktop/
File Edit View Terminal Help
4: Exit
Enter your choice:-
3
Obtain Start time is:- 2015-11-05 20:05:06.8
Obtain End time is:- 2015-11-05 20:06:02.253
Time taken by 10K Obtain operations is:- 55453
Do you want to repeat menu (Y/N) ?

sujoy@ubuntu: ~/Desktop/Assig
File Edit View Terminal Help
4: Exit
Enter your choice:-
3
Obtain Start time is:- 2015-11-05 20:05:08.076
Obtain End time is:- 2015-11-05 20:06:01.425
Time taken by 10K Obtain operations is:- 53349
Do you want to repeat menu (Y/N) ?

sujoy@ubuntu: ~/Desktop/Assignme
File Edit View Terminal Help
4: Exit
Enter your choice:-
3
Obtain Start time is:- 2015-11-05 20:05:09.272
Obtain End time is:- 2015-11-05 20:06:02.387
Time taken by 10K Obtain operations is:- 53115
Do you want to repeat menu (Y/N) ?

sujoy@ubuntu: ~/Desktop/Assignment
File Edit View Terminal Help
2: Search File
3: Obtain File
4: Exit
Enter your choice:-
3
Obtain Start time is:- 2015-11-05 20:05:10.56
Obtain End time is:- 2015-11-05 20:06:02.9
Time taken by 10K Obtain operations is:- 52340
Do you want to repeat menu (Y/N) ?

sujoy@ubuntu: ~/Desktop/
File Edit View Terminal Help
1: Register File
2: Search File
3: Obtain File
4: Exit
Enter your choice:-
3
Obtain Start time is:- 2015-11-05 20:05:15.484
Obtain End time is:- 2015-11-05 20:06:05.473
Time taken by 10K Obtain operations is:- 49989
Do you want to repeat menu (Y/N) ?

sujoy@ubuntu: ~/Desktop/Assig
File Edit View Terminal Help
1: Register File
2: Search File
3: Obtain File
4: Exit
Enter your choice:-
3
Obtain Start time is:- 2015-11-05 20:05:14.287
Obtain End time is:- 2015-11-05 20:06:04.973
Time taken by 10K Obtain operations is:- 50686
Do you want to repeat menu (Y/N) ?

sujoy@ubuntu: ~/Desktop/Assignme
File Edit View Terminal Help
Reached Client menu
1: Register File
2: Search File
3: Obtain File
4: Exit
Enter your choice:-
3
Obtain Start time is:- 2015-11-05 20:05:13.077
Obtain End time is:- 2015-11-05 20:06:04.64
Time taken by 10K Obtain operations is:- 51563
Do you want to repeat menu (Y/N) ?

sujoy@ubuntu: ~/Desktop/Assignment
File Edit View Terminal Help
Reached Client menu
1: Register File
2: Search File
3: Obtain File
4: Exit
Enter your choice:-
3
Obtain Start time is:- 2015-11-05 20:05:11.82
Obtain End time is:- 2015-11-05 20:06:03.897
Time taken by 10K Obtain operations is:- 52077
Do you want to repeat menu (Y/N) ?
```

Time :- 52321

Throughput 1529 operations/second

Response time- 0.6540 milliseconds/ request