Application 5:
Relay based Peer-to-Peer System using Client-Server socket programming

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Phase 1:

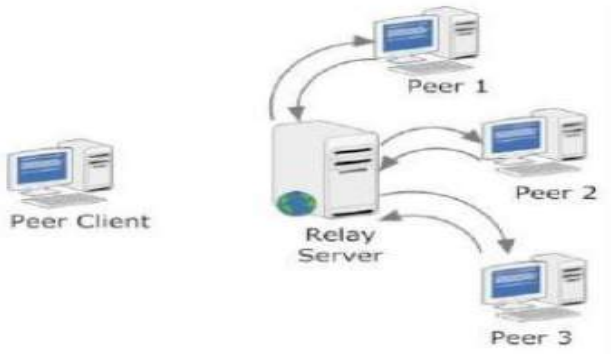


Figure 1

SERVER:

Compilation: g++ server.cpp -o server
To Run: ./server < port number of server >
Since the port numbers from 0 to 1023 are reserved, the server port number should be greater than 1023.

```
darshika@darshika-HP-Laptop-15-da1xxx:~/Desktop/Relay-Based-P2P-Server-master/se
rver$ g++ server.cpp -o server
darshika@darshika-HP-Laptop-15-da1xxx:~/Desktop/Relay-Based-P2P-Server-master/se
rver$ ./server 4498
Socket created successfully.
Relay server is listening on port : 4498
```

PEER NODES:

Compilation: g++peer.cpp -o peer1
To Run: ./peer1 <Server IP Address> <Server port number> <Peer port number>

☐ **Connecting PEER_NODE_1 to the relay server:**

```
darshika@darshika-HP-Laptop-15-da1xxx:~/Desktop/Re
er1$ g++ peer.cpp -o peer1
darshika@darshika-HP-Laptop-15-da1xxx:~/Desktop/Re
er1$ ./peer1 127.0.0.1 4498 1601
Sent request to server.

Enter IP address of current peer: 127.0.0.1
Enter port no. of current peer: 1601

Peer_1 is listening on port 1601
```

☐ **Connecting PEER_NODE_2 to the relay server:**

```
darshika@darshika-HP-Laptop-15-da1xxx:~/Desktop/Relay-Based-P2P-Server-master/pe
er2$ g++ peer.cpp -o peer2
darshika@darshika-HP-Laptop-15-da1xxx:~/Desktop/Relay-Based-P2P-Server-master/pe
er2$ ./peer2 127.0.0.1 4498 1602
Sent request to server.
Enter IP address of current peer: 127.0.0.1
Enter port no. of current peer: 1602

Peer_2 is listening on port 1602
```

☐ **Connecting PEER_NODE_3 to the relay server:**

```
darshika@darshika-HP-Laptop-15-da1xxx:~/Desktop/Relay-Based-P2P-Server-master/pe
er3$ g++ peer.cpp -o peer3
darshika@darshika-HP-Laptop-15-da1xxx:~/Desktop/Relay-Based-P2P-Server-master/pe
er3$ ./peer3 127.0.0.1 4498 1603
Sent request to server.
Enter IP address of current peer: 127.0.0.1
Enter port no. of current peer: 1603
Peer_3 is listening on port 1603
```

The relay server contains information of all the active nodes in the network.

```
darshika@darshika-HP-Laptop-15-da1xxx:~/Desktop/Relay-Based-P2P-Server-master/server$ g++ server.cpp -o server
darshika@darshika-HP-Laptop-15-da1xxx:~/Desktop/Relay-Based-P2P-Server-master/server$ ./server 4498
Socket created successfully.
Relay server is listening on port : 4498

Connection 1 accepted from peer.
Peer socket 127.0.0.1 : 1601 registered in relay server.

Connection 2 accepted from peer.
Peer socket 127.0.0.1 : 1602 registered in relay server.

Connection 3 accepted from peer.
Peer socket 127.0.0.1 : 1603 registered in relay server.
```

Phase 2:

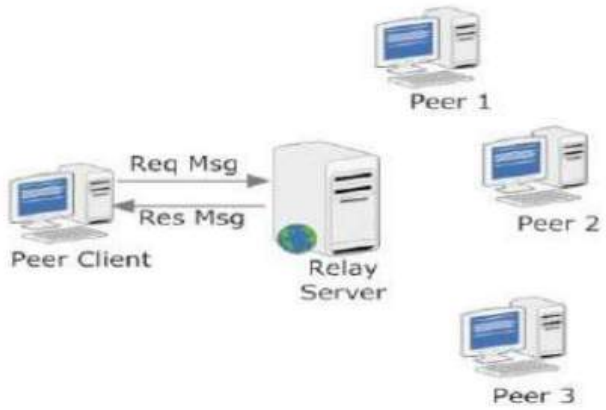


Figure 2

CLIENT:

Compilation: g++ client.cpp -o client
To Run: ./client <Server IP address> <Server port number>

```
darshika@darshika-HP-Laptop-15-da1xxx:~/Desktop/Relay-Based-P2P-Server-master/client$ g++ client.cpp -o client
darshika@darshika-HP-Laptop-15-da1xxx:~/Desktop/Relay-Based-P2P-Server-master/client$ ./client 127.0.0.1 4498
Peer data received!
```

The client requests the relay server for the information of the active peer nodes in the network. The relay server gives the response to the client about the same. On receiving the response message from the server the client closes the connection gracefully.

The information that the client want from the server:

```
Connection 1 accepted from peer.
Peer socket 127.0.0.1 : 1601 registered in relay server.

Connection 2 accepted from peer.
Peer socket 127.0.0.1 : 1602 registered in relay server.

Connection 3 accepted from peer.
Peer socket 127.0.0.1 : 1603 registered in relay server.
```

Phase 3:

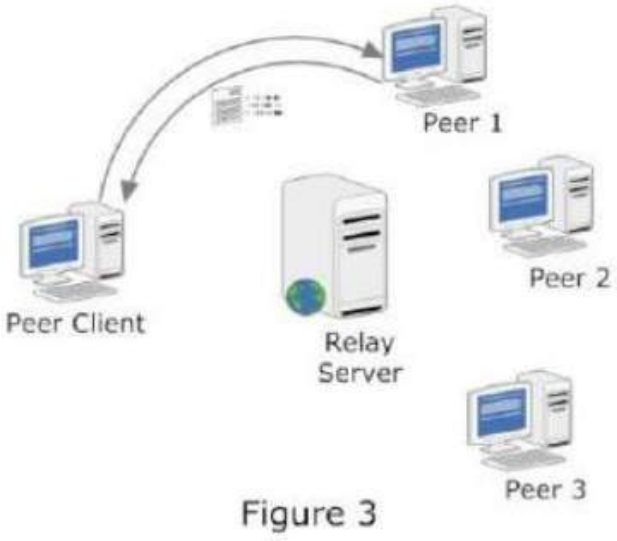
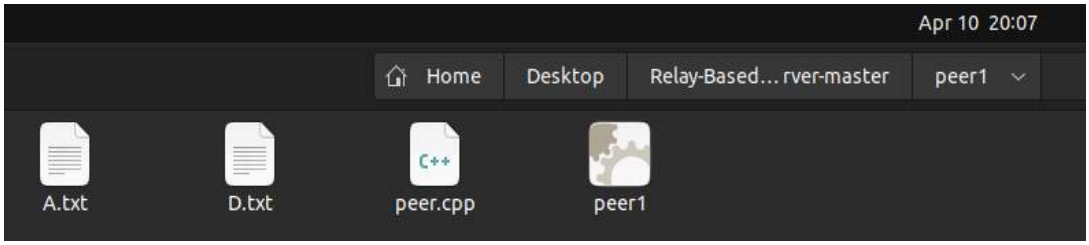


Figure 3

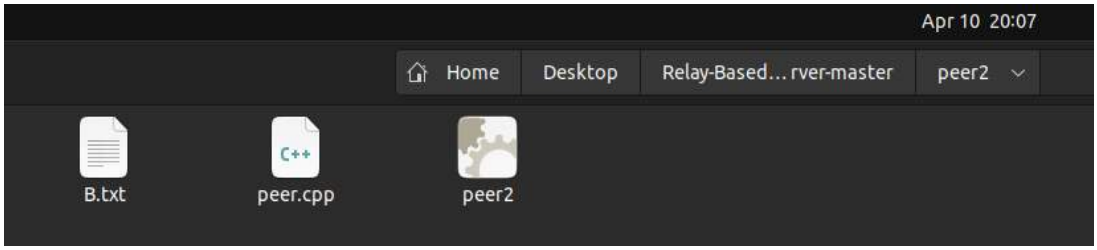
Distribution of files among the peer nodes is as follows:

PEER_NODE_1:



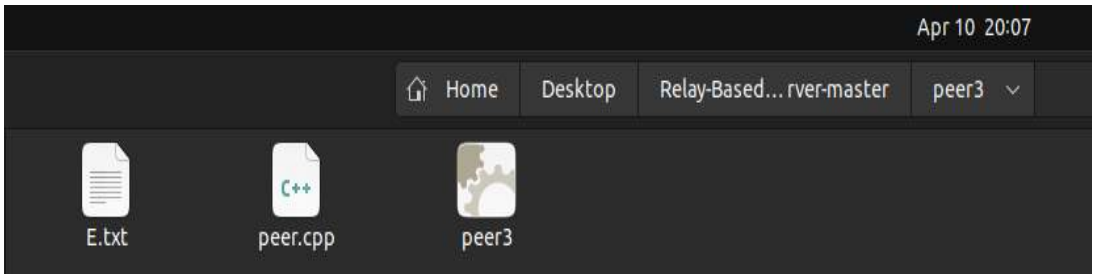
Peer1 contains file A.txt and D.txt.

PEER_NODE_2:



Peer1 contains file B.txt.

PEER_NODE_3:



Peer1 contains file E.txt.

—> **On request for file E.txt:**

The file is searched in peer_1, when the file is not found the file is searched in peer_2, when the file is not found the file is searched in peer_1. The file is found and the connection is closed.

The content of the file is printed along with the IP address and Port Number of the Peer Node where the file is found!!

```
darshika@darshika-HP-Laptop-15-da1xxx:~/Desktop/Relay-Based-P2P-Server-master/client$ g++ client.cpp -o client
darshika@darshika-HP-Laptop-15-da1xxx:~/Desktop/Relay-Based-P2P-Server-master/client$ ./client 127.0.0.1 4498
Peer data received!

Enter filename to find (including .txt): E.txt

|127.0.0.1|1601|
File not found at socket 127.0.0.1:1601
|127.0.0.1|1602|
File not found at socket 127.0.0.1:1602
|127.0.0.1|1603|
File found at socket 127.0.0.1:1603
File received from the peer!

Content of File:-
So you can keep me
Inside the pocket of your ripped jeans
Holding me closer 'til our eyes meet
You won't ever be alone, wait for me to come home
Loving can heal, loving can mend your soul
And it's the only thing that I know, know
I swear it will get easier
Remember that with every piece of ya
Hmm, and it's the only thing we take with us when we die
```

—> **On request for file B.txt:**

The file is searched in peer_1, when the file is not found the file is searched in peer_2. The file is found and the connection is closed.
The content of the file is printed along with the IP address and Port Number of the Peer Node where the file is found!!

—> On request for file A.txt:
The file is searched in peer_1.The file is found and the connection is closed.
The content of the file is printed along with the IP address and Port Number of the Peer Node where the file is found!!