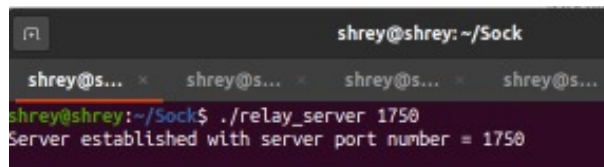


# Application ID 6: Relay based Peer-to-Peer System using Client-Server socket programming

## Group 30

Rishav Mondal (190101072)  
Siddharth Charan (190101085)  
Shrey Verma (190101083)  
Karan Raj Sharma (190101043)

## 1 Phase - 1



```
shrey@shrey: ~/Sock
shrey@s... x shrey@s... x shrey@s... x shrey@s...
shrey@shrey:~/Sock$ ./relay_server 1750
Server established with server port number = 1750
```

We first compile and run the server `Relay_Server.c`

1. **Compilation** : `gcc Relay_Server.c -o relay_server`

2. **Running** : `./relay_server <Server port number>`

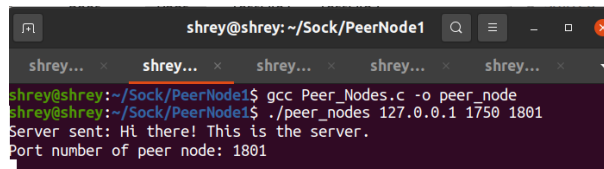
The port number should be  $\geq 1024$  as those ports are reserved for common network functionalities.

After starting the server, we will try to compile and run the various peer nodes. We navigate to the directories indicated by the 3 nodes (`PeerNode1`, `PeerNode2` and `PeerNode3`).

1. **Compilation** : `gcc Peer_Nodes.c -o peer_nodes`

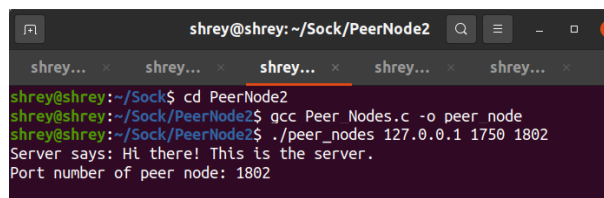
2. **Running** : `./peer_nodes <Server IP Address> <Server port number> <Peer port number>`

The port number should be  $\geq 1024$  as those ports are reserved for common network functionalities. We use the loopback IP address for the IP, which can be found by using `ifconfig` command.



```
shrey@shrey: ~/Sock/PeerNode1
shrey... x shrey... x shrey... x shrey... x shrey... x
shrey@shrey:~/Sock/PeerNode1$ gcc Peer_Nodes.c -o peer_node
shrey@shrey:~/Sock/PeerNode1$ ./peer_nodes 127.0.0.1 1750 1801
Server sent: Hi there! This is the server.
Port number of peer node: 1801
```

Figure 1: Peer\_Node-1



```
shrey@shrey: ~/Sock/PeerNode2
shrey... x shrey... x shrey... x shrey... x shrey... x
shrey@shrey:~/Sock$ cd PeerNode2
shrey@shrey:~/Sock/PeerNode2$ gcc Peer_Nodes.c -o peer_node
shrey@shrey:~/Sock/PeerNode2$ ./peer_nodes 127.0.0.1 1750 1802
Server says: Hi there! This is the server.
Port number of peer node: 1802
```

Figure 2: Peer\_Node-2

```

shrey@shrey: ~/Sock/PeerNode3
shrey@shrey:~/Sock/PeerNode3$ gcc Peer_Nodes.c -o peer_node
shrey@shrey:~/Sock/PeerNode3$ ./peer_nodes 127.0.0.1 1750 1803
Server says: Hi there! This is the server.
Port number of peer node: 1803

```

Figure 3: Peer\_Node-3

## 2 Phase - 2

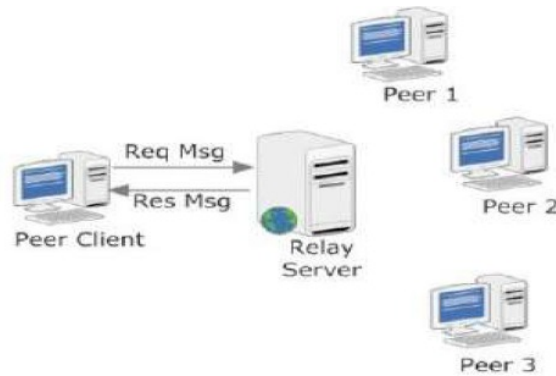


Figure 2

1. **Compilation** : gcc Peer\_Client.c -o peer\_client
2. **Running** : ./peer\_client <Server IP address> <Server port number>

```

shrey@shrey: ~/Sock
shrey@shrey:~/Sock$ ./relay_server 1750
Server established with server port number = 1750

Connection accepted
Message: Hey! This is peer node.
Peer node port: 1801
Peer node IP: 127.0.0.1

Connection accepted
Message: Hi there! This is peer node.
Peer node port: 1802
Peer node IP: 127.0.0.1

Connection accepted
Message: Hi there! This is peer node.
Peer node port: 1803
Peer node IP: 127.0.0.1

Connection accepted
Message: Hey!!! This is the client.
Peer client port: 38660
Peer client IP: 127.0.0.1
Number of peer nodes = 3

```

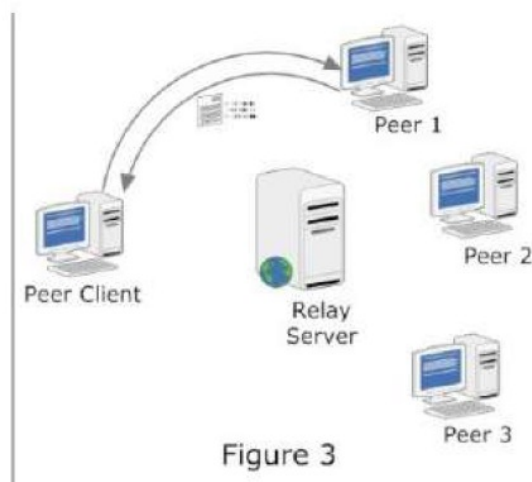
The **Peer\_Client** connects with **Relay\_Server** and requests it for information of active **Peer\_Nodes**. Then the **Relay\_Server** responds with the information of the active **Peer\_Nodes** which it currently has. On receiving the response message from the **Relay\_Server**, the **Peer\_Client** closes the connection gracefully.

```

shrey@shrey: ~/Sock
shrey... x shrey... x shrey... x shrey... x shrey... x
shrey@shrey:~/Sock$ ./peer_client 127.0.0.1 1758
Server is responding with: Hi there! This is the server.
PeerNode Count : 3
PeerNode IP: 127.0.0.1
PeerNode port: 1801
PeerNode IP: 127.0.0.1
PeerNode port: 1802
PeerNode IP: 127.0.0.1
PeerNode port: 1803

```

### 3 Phase - 3



We distribute the test files in the following way:

- PeerNode1 contains TextFile1.txt and TextFile2.txt
- PeerNode2 contains TextFile2.txt and TextFile3.txt
- PeerNode3 contains TextFile1.txt and TextFile3.txt

On requesting **TestFile1.txt**, which is present in **Peer\_Nodes** 1 and 3 then they will transfer the data back and in whichever one the file is found first is returned as shown:

```

shrey@shrey: ~/Sock/PeerNode1
shrey... x shrey... x shrey... x shrey... x shrey... x
shrey@shrey:~/Sock/PeerNode1$ ./peer_nodes 127.0.0.1 1750 1801
Server sent: Hi there! This is the server.
Port number of peer node: 1801
Client server requesting for file TestFile1.txt
File size: 53 bytes
Server sent 53 bytes from file's data, offset = 53 and remaining data = 0
File transfer complete.

Client server requesting for file TestFile3.txt
File not found

```

```
shrey@shrey: ~/Sock/PeerNode2
shrey@shrey:~/Sock/PeerNode2$ ./peer_nodes 127.0.0.1 1750 1802
Server says: Hi there! This is the server.
Port number of peer node: 1802
Client server is requesting for file with filename = TestFile3.txt
File size: 53 bytes
Server sent 53 bytes from file's data, offset = 53 and remaining data = 0
File transfer completed
```

```
shrey@shrey: ~/Sock/PeerNode3
shrey@shrey:~/Sock/PeerNode3$ ./peer_nodes 127.0.0.1 1750 1803
Server says: Hi there! This is the server.
Port number of peer node: 1803
```

```
shrey@shrey: ~/Sock
shrey@shrey:~/Sock$ ./peer_client 127.0.0.1 1750
Server is responding with: Hi there! This is the server.

PeerNode Count : 3

PeerNode IP: 127.0.0.1
PeerNode port: 1801
PeerNode IP: 127.0.0.1
PeerNode port: 1802
PeerNode IP: 127.0.0.1
PeerNode port: 1803
Please, enter the name of the file:
TestFile3.txt
Peer node number:1
Peer node port: 1801
Peer node IP: 127.0.0.1
Connection to peer node is established
File not found in peer node number 1

Peer node number:2
Peer node port: 1802
Peer node IP: 127.0.0.1
Connection to peer node is established
File is found in peer node 2
File size = 53
Buffer currently contains: This file is present in Peer Node 2 and Peer
Node 3.

Received bytes = 53 bytes, Remaining bytes = 0 bytes
Congratulations, File transfer is completed successfully
shrey@shrey:~/Sock$
```

In case the requested file was not found in any node, we get the output as following:

```
shrey@shrey: ~/Sock
shrey@shrey:~/Sock$ ./peer_client 127.0.0.1 1750
Server is responding with: Hi there! This is the server.

PeerNode Count : 3

PeerNode IP: 127.0.0.1
PeerNode port: 1801
PeerNode IP: 127.0.0.1
PeerNode port: 1802
PeerNode IP: 127.0.0.1
PeerNode port: 1803
Please, enter the name of the file:
test.txt
Peer node number:1
Peer node port: 1801
Peer node IP: 127.0.0.1
Connection to peer node is established
File not found in peer node number 1

Peer node number:2
Peer node port: 1802
Peer node IP: 127.0.0.1
Connection to peer node is established
File not found in peer node number 2

Peer node number:3
Peer node port: 1803
Peer node IP: 127.0.0.1
Connection to peer node is established
File not found in peer node number 3

File not found in all peer_nodes
shrey@shrey:~/Sock$
```