

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

Group Number- 15

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Phase 1:

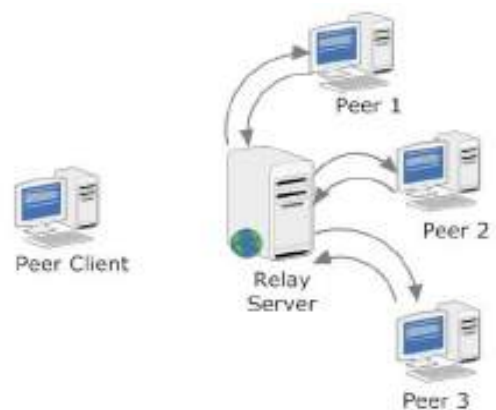


Figure 1

Usage of server.c :

Compilation: gcc server.c -o server

Running: ./server <Server port number>

(Port number should be > 1023, port numbers 0 to 1023 are reserved)

```
sagar@sagar-HP-Pavilion-15-Notebook-PC:~/Documents/Group_15$ ./server 1700
Server established with server port number = 1700
```

**This denotes that the server is now open with a given port number.

Usage of nodes.c :

Compilation: gcc nodes.c -o nodes

Running: ./nodes <Server IP Address> <Server port number> <Peer port number>

(Port number should be > 1023, port numbers 0 to 1023 are reserved)

IP address can be used by using command "ifconfig"

```
sagar@sagar-HP-Pavilion-15-Notebook-PC:~/Documents/Group_15/PeerNode1$ ./node 127.0.0.1 1600 1801
Server says: Hi there! This is the server.
Port number of peer node: 1801
```

**Peer Node 1 connected to the relay server

```
sagar@sagar-HP-Pavilion-15-Notebook-PC:~/Documents/Group_15/PeerNode2$ ./node 127.0.0.1 1600 1802
Server says: Hi there! This is the server.
Port number of peer node: 1802
```

**Peer Node 2 connected to the relay server

```
sagar@sagar-HP-Pavilion-15-Notebook-PC:~/Documents/Group_15/PeerNode3$ ./node 127.0.0.1 1600 1803
Server says: Hi there! This is the server.
Port number of peer node: 1803
```

**Peer Node 3 connected to the relay server

The Relay_Server actively maintains all the received information with it.

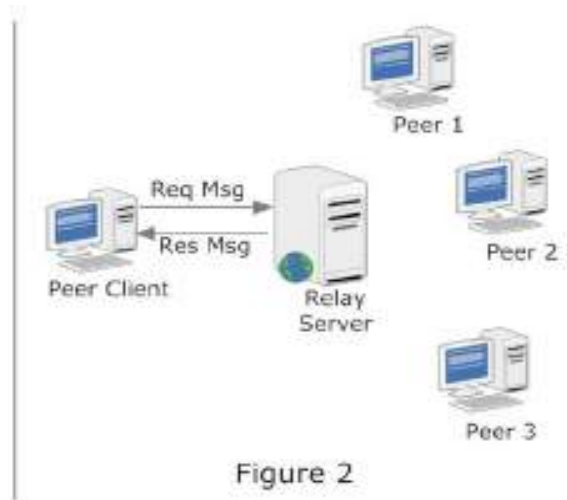
```
sagar@sagar-HP-Pavilion-15-Notebook-PC:~/Documents/Group_15$ ./server 1600
Server established with server port number = 1600

Connection accepted
Message: Hi there! 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
```

Phase 2:



Usage of client.c :

Compilation: gcc client.c -o client

Running: ./client <Server IP address> <Server port number>

```
sagar@sagar-HP-Pavilion-15-Notebook-PC:~/Documents/Group_15$ ./server 1600
Server established with server port number = 1600

Connection accepted
Message: Hi there! 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: Hi there! This is the client.
Peer client port: 54964
Peer client IP: 127.0.0.1
Number of peer nodes = 3
```

Peer_Client connects with Relay_Server and requests it for active Peer_Nodes information.

The Relay_Server responds to the Peer_Client with the active Peer_Nodes information

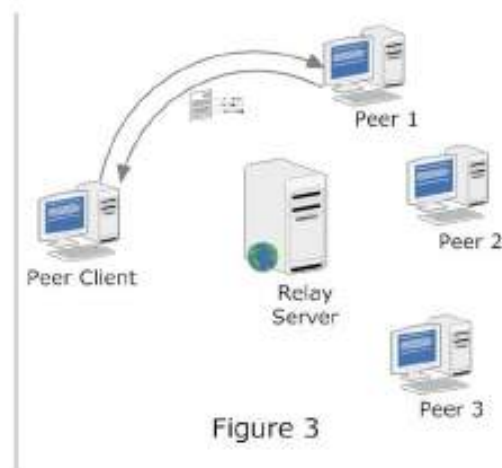
currently having it. On receiving the response message from the Relay_Server, the Peer_Client closes the connection gracefully.

```
sagar@sagar-HP-Pavilion-15-Notebook-PC:~/Documents/Group_15$ ./client 127.0.0.1 1600
Server says: Hi there! This is the server.

PeerNode Count : 3

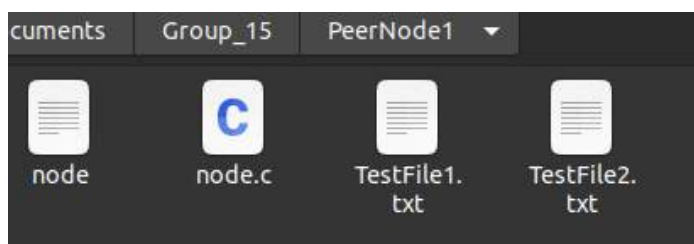
PeerNode IP: 127.0.0.1
PeerNode port: 1801
PeerNode IP: 127.0.0.1
PeerNode port: 1802
PeerNode IP: 127.0.0.1
PeerNode port: 1803
```

Phase 3:

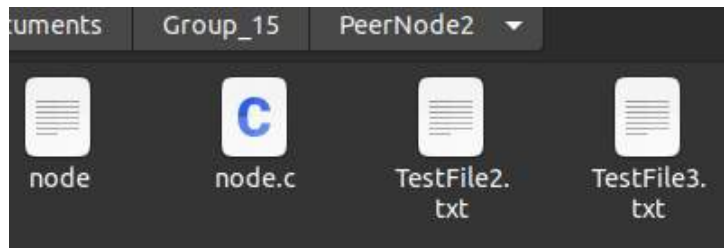


The distribution of test files is as follows:

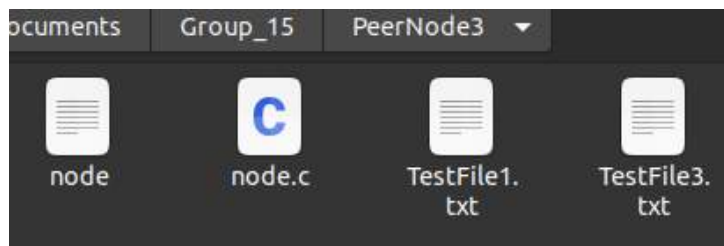
Peer node 1 contains TestFile1.txt and TextFile2.txt



Peer node 2 contains TestFile2.txt and TextFile3.txt



Peer node 3 contains TestFile1.txt and TextFile3.txt



On requesting TestFile1.txt, it is found in peer nodes 1 and 3 and they transfer the data back as shown:

```
sagar@sagar-HP-Pavilion-15-Notebook-PC:~/Documents/Group_15/PeerNode1$ ./node 127.0.0.1 1600 1801
Server says: Hi there! This is the server.
Port number of peer node: 1801
client server is requesting for file with filename = TestFile1.txt
File size: 484 bytes
1. Server sent 484 bytes from file's data, offset is now : 484 and remaining data = 0
File transfer completed
```

```
sagar@sagar-HP-Pavilion-15-Notebook-PC:~/Documents/Group_15/PeerNode2$ ./node 127.0.0.1 1600 1802
Server says: Hi there! This is the server.
Port number of peer node: 1802
client server is requesting for file with filename = TestFile1.txt
File not found
```

```
sagar@sagar-HP-Pavilion-15-Notebook-PC:~/Documents/Group_15/PeerNode3$ ./node 127.0.0.1 1600 1803
Server says: Hi there! This is the server.
Port number of peer node: 1803
client server is requesting for file with filename = TestFile1.txt
File size: 484 bytes
1. Server sent 484 bytes from file's data, offset is now : 484 and remaining data = 0
File transfer completed
```



```

Enter the name of the file:
TestFile1.txt
Peer node number:1
Peer node port: 1801
Peer node IP: 127.0.0.1
Connected to peer node
File found in peer node number 1
File size = 484
Buffer currently contains: Initially, the Peer_Nodes (peer 1/2/3 as shown in Figure 1) will connect to the Relay_Server using the TCP port
already known to them. After successful connection, all the Peer_Nodes provide their information (IP address
and PORT) to the Relay_Server and close the connections (as shown in Figure 1). The Relay_Server actively
maintains all the received information with it. Now the Peer_Nodes will act as servers and wait to accept
connection from Peer_Clients (refer phase three).

Received = 484 bytes, Remaining = 0 bytes
File transfer completed
Peer node number:2
Peer node port: 1802
Peer node IP: 127.0.0.1
Connected to peer node
File not found in peer node number 2

Peer node number:3
Peer node port: 1803
Peer node IP: 127.0.0.1
Connected to peer node
File found in peer node number 3
File size = 484
Buffer currently contains: Initially, the Peer_Nodes (peer 1/2/3 as shown in Figure 1) will connect to the Relay_Server using the TCP port
already known to them. After successful connection, all the Peer_Nodes provide their information (IP address
and PORT) to the Relay_Server and close the connections (as shown in Figure 1). The Relay_Server actively
maintains all the received information with it. Now the Peer_Nodes will act as servers and wait to accept
connection from Peer_Clients (refer phase three).

Received = 484 bytes, Remaining = 0 bytes
File transfer completed

```

On requesting TestFile2.txt, it is found in peer nodes 1 and 2 and they transfer the data back as shown:

Peernode-1:

```

Client server is requesting for file with filename = TestFile2.txt
File size: 459 bytes
1. Server sent 459 bytes from file's data, offset is now : 459 and remaining dat
a = 0
File transfer completed

```

Peernode-2:

```

Client server is requesting for file with filename = TestFile2.txt
File size: 459 bytes
1. Server sent 459 bytes from file's data, offset is now : 459 and remaining dat
a = 0
File transfer completed

```

Peernode-3:

```

Client server is requesting for file with filename = TestFile2.txt
File not found

```

```

Enter the name of the file:
TestFile2.txt
Peer node number:1
Peer node port: 1801
Peer node IP: 127.0.0.1
Connected to peer node
File found in peer node number 1
File size = 459
Buffer currently contains: In second phase, the Peer_Client will connect to the Relay_Server using the server's TCP port already known to
it. After successful connection; it will request the Relay_Server for active Peer_Nodes information (as shown in
Figure 2). The Relay_Server will response to the Peer_Client with the active Peer_Nodes information currently
having with it. On receiving the response message from the Relay_Server, the Peer_Client closes the connection
gracefully.

Received = 459 bytes, Remaining = 0 bytes
File transfer completed

Peer node number:2
Peer node port: 1802
Peer node IP: 127.0.0.1
Connected to peer node
File found in peer node number 2
File size = 459
Buffer currently contains: In second phase, the Peer_Client will connect to the Relay_Server using the server's TCP port already known to
it. After successful connection; it will request the Relay_Server for active Peer_Nodes information (as shown in
Figure 2). The Relay_Server will response to the Peer_Client with the active Peer_Nodes information currently
having with it. On receiving the response message from the Relay_Server, the Peer_Client closes the connection
gracefully.

Received = 459 bytes, Remaining = 0 bytes
File transfer completed

Peer node number:3
Peer node port: 1803
Peer node IP: 127.0.0.1
Connected to peer node
File not found in peer node number 3

```

If requested file is not present in any peer node:

```

Enter the name of the file:
Test.txt
Peer node number:1
Peer node port: 1801
Peer node IP: 127.0.0.1
Connected to peer node
File not found in peer node number 1

Peer node number:2
Peer node port: 1802
Peer node IP: 127.0.0.1
Connected to peer node
File not found in peer node number 2

Peer node number:3
Peer node port: 1803
Peer node IP: 127.0.0.1
Connected to peer node
File not found in peer node number 3

```