

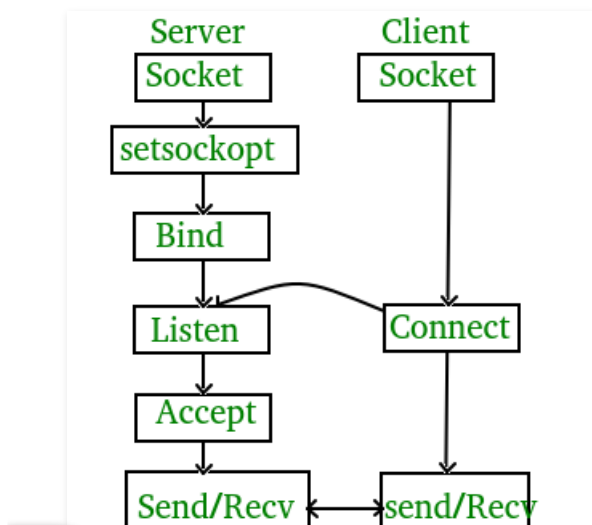
# TCP Server-Client implementation in C

Difficulty Level : Hard • Last Updated : 02 Feb, 2022

Prerequisites – [Socket Programming in C/C++](#), [TCP and UDP server using select](#), [UDP Server-Client implementation in C](#)

If we are creating a connection between client and server using TCP then it has few functionality like, TCP is suited for applications that require high reliability, and transmission time is relatively less critical. It is used by other protocols like HTTP, HTTPs, FTP, SMTP, Telnet. TCP rearranges data packets in the order specified. There is absolute guarantee that the data transferred remains intact and arrives in the same order in which it was sent. TCP does Flow Control and requires three packets to set up a socket connection, before any user data can be sent. TCP handles reliability and congestion control. It also does error checking and error recovery. Erroneous packets are retransmitted from the source to the destination.

The entire process can be broken down into following steps:



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2. using `bind()`, bind the socket to server address.
3. using `listen()`, put the server socket in a passive mode, where it waits for the client to approach the server to make a connection
4. using `accept()`, At this point, connection is established between client and server, and they are ready to transfer data.
5. Go back to Step 3.

### TCP Client –

1. Create TCP socket.
2. connect newly created client socket to server.

TCP Server:

## C

```
#include <stdio.h>
#include <netdb.h>
#include <netinet/in.h>
#include <stdlib.h>
#include <string.h>
#include <sys/socket.h>
#include <sys/types.h>
#define MAX 80
#define PORT 8080
#define SA struct sockaddr

// Function designed for chat between client and server.
void func(int connfd)
{
    char buff[MAX];
    int n;
    // infinite loop for chat
    for (;;) {
        bzero(buff, MAX);

        // read the message from client and copy it in buffer
        read(connfd, buff, sizeof(buff));
```

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```

        // if msg contains "Exit" then server exit and chat ended.
        if (strncmp("exit", buff, 4) == 0) {
            printf("Server Exit...\n");
            break;
        }
    }
}

// Driver function
int main()
{
    int sockfd, connfd, len;
    struct sockaddr_in servaddr, cli;

    // socket create and verification
    sockfd = socket(AF_INET, SOCK_STREAM, 0);
    if (sockfd == -1) {
        printf("socket creation failed...\n");
        exit(0);
    }
    else
        printf("Socket successfully created..\n");
    bzero(&servaddr, sizeof(servaddr));

    // assign IP, PORT
    servaddr.sin_family = AF_INET;
    servaddr.sin_addr.s_addr = htonl(INADDR_ANY);
    servaddr.sin_port = htons(PORT);

    // Binding newly created socket to given IP and verification
    if ((bind(sockfd, (SA*)&servaddr, sizeof(servaddr))) != 0) {
        printf("socket bind failed...\n");
        exit(0);
    }
    else
        printf("Socket successfully binded..\n");

    // Now server is ready to listen and verification
    if ((listen(sockfd, 5)) != 0) {
        printf("Listen failed...\n");
        exit(0);
    }
    -

```

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```

else
    printf("server accept the client...\n");

// Function for chatting between client and server
func(connfd);

// After chatting close the socket
close(sockfd);
}

```

### TCP Client:

#### C

```

#include <netdb.h>
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <sys/socket.h>
#define MAX 80
#define PORT 8080
#define SA struct sockaddr
void func(int sockfd)
{
    char buff[MAX];
    int n;
    for (;;) {
        bzero(buff, sizeof(buff));
        printf("Enter the string : ");
        n = 0;
        while ((buff[n++] = getchar()) != '\n')
            ;
        write(sockfd, buff, sizeof(buff));
        bzero(buff, sizeof(buff));
        read(sockfd, buff, sizeof(buff));
        printf("From Server : %s", buff);
        if ((strncmp(buff, "exit", 4)) == 0) {
            printf("Client Exit...\n");
            break;
        }
    }
}

```

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```
if (sockfd == -1) {
    printf("socket creation failed...\n");
    exit(0);
}
else
    printf("Socket successfully created..\n");
bzero(&servaddr, sizeof(servaddr));

// assign IP, PORT
servaddr.sin_family = AF_INET;
servaddr.sin_addr.s_addr = inet_addr("127.0.0.1");
servaddr.sin_port = htons(PORT);

// connect the client socket to server socket
if (connect(sockfd, (SA*)&servaddr, sizeof(servaddr)) != 0) {
    printf("connection with the server failed...\n");
    exit(0);
}
else
    printf("connected to the server..\n");

// function for chat
func(sockfd);

// close the socket
close(sockfd);
}
```

## Compilation -

Server side:

```
gcc server.c -o server
./server
```

Client side:

```
gcc client.c -o client
./client
```

## Output -

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```
From client: hi
    To client : hello
From client: exit
    To client : exit
Server Exit...
```

Client side:

```
Socket successfully created..
connected to the server..
Enter the string : hi
From Server : hello
Enter the string : exit
From Server : exit
Client Exit...
```

If (Coding)

```
{
  C foundation course = true;
  Focus = 100;
}
cout << "Success";
```

Wait no more!

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