

Networks Lab: Broadcasting, Multicasting

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server.c

```
#include <unistd.h>
#include <stdio.h>
#include <sys/socket.h>
#include <stdlib.h>
#include <netinet/in.h>
#include <string.h>
#define PORT 8080
typedef enum{ DATA,ACK } MSGKIND;
struct timeval timeout;

struct MESSAGE
{
    MSGKIND type;
    int seq;
    unsigned int len;
    char msg[100];
    // int parity;
};

int main(int argc, char const *argv[])
{
    timeout.tv_sec = 1;
    timeout.tv_usec = 0;
    int server_fd, new_socket[5], valread;
    struct sockaddr_in address;
    int opt = 1;
    int addrlen = sizeof(address);
    char buffer[1024] = {0};

    if ((server_fd = socket(AF_INET, SOCK_STREAM, 0)) == 0)
    {
        perror("socket failed");
        exit(EXIT_FAILURE);
    }

    if (setsockopt(server_fd, SOL_SOCKET, SO_RCVTIMEO, (char *)&timeout, sizeof(timeout))
    < 0)
    {
        perror("setsockopt");
        exit(EXIT_FAILURE);
    }
    address.sin_family = AF_INET;
    address.sin_addr.s_addr = INADDR_ANY;
    address.sin_port = htons( PORT );

    if (bind(server_fd, (struct sockaddr *)&address,
    sizeof(address))<0)
    {
```

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        perror("bind failed");
        exit(EXIT_FAILURE);
    }
    if (listen(server_fd, 5) < 0)
    {
        perror("listen");
        exit(EXIT_FAILURE);
    }

```

```

    for(int j=0;j<5;j++)
    {
        if ((new_socket[j] = accept(server_fd, (struct sockaddr *)&address, (socklen_t*)&addrlen))<0)
        {
            perror("accept");
            exit(EXIT_FAILURE);
        }
        if (setsockopt(new_socket[j], SOL_SOCKET, SO_RCVTIMEO, (char *)&timeout, sizeof(timeout)) < 0)
        {
            perror("setsockopt");
            exit(EXIT_FAILURE);
        }
    }
    printf("All 5 client sockets accepted!\n");

    int clients[5];
    int n;
    int count=0;
    while(1)
    {
        count++;
        struct MESSAGE* Message = (struct MESSAGE*) malloc(sizeof(struct MESSAGE));
        Message->type = DATA;
        char news[100]="KKR beat CSK by 10 runs";
        printf("Msg%d: %s\n",count,news);
        Message->len = strlen(news);
        strcpy(Message->msg, news);
        Message->seq = count;
        scanf("%d",&n);
        if(n==0)
        {
            printf("Closing server...\n");
            break;
        }
        else if(n==5)
        {
            printf("Broadcasting...\n");
            sleep(1);
            for(int i=0;i<n;i++)
            {
                send(new_socket[i],(void*)Message, sizeof(struct MESSAGE), 0);
            }
        }
    }

```

```

else
{
    for(int i=0;i<n;i++)
    {
        scanf("%d",&clients[i]);
    }
    printf("Multicasting to: ");
    for(int i=0;i<n;i++)
        printf("%d ",clients[i]);
    printf("\n");
    sleep(1);

```

```

        for(int i=0;i<n;i++)
        {
            send(new_socket[clients[i]],(void*)Message, sizeof(struct MESSAGE), 0);
        }
    }
    for(int i=0;i<5;i++)
        close(new_socket[i]);
    return 0;
}

```

client.c

```

#include <stdio.h>
#include <stdlib.h>
#include <sys/socket.h>
#include <arpa/inet.h>
#include <unistd.h>
#include <string.h>
#define PORT 8080
typedef enum{ DATA,ACK } MSGKIND;
struct MESSAGE
{
    MSGKIND type;
    int seq;
    unsigned int len;
    char msg[100];
    int parity;
};

int main(int argc, char const *argv[])
{
    int sock = 0, valread;
    struct sockaddr_in serv_addr;
    char buffer[1024] = {0};
    if ((sock = socket(AF_INET, SOCK_STREAM, 0)) < 0)
    {
        printf("\n Socket creation error \n");
        return -1;
    }

```

```

}

serv_addr.sin_family = AF_INET;
serv_addr.sin_port = htons(PORT);

if(inet_pton(AF_INET, "127.0.0.1", &serv_addr.sin_addr)<=0)
{
    printf("\nInvalid address/ Address not supported \n");
    return -1;
}

if (connect(sock, (struct sockaddr *)&serv_addr, sizeof(serv_addr)) < 0)
{
    printf("\nConnection Failed \n");
    return -1;
}

```

```

while(1)
{
    //send(sock,(void*)Acknowledge, sizeof(struct MESSAGE), 0);
    struct MESSAGE* Message = (struct MESSAGE*) malloc(sizeof(struct MESSAGE));
    send(sock, Message, sizeof(struct MESSAGE), 0);
}

```

```

    if(recv(sock, Message, sizeof(struct MESSAGE), 0) > 0)
    {
        printf("Seq:%d Message recvd: %s\n",Message->seq,Message->msg);
    }

}

close(sock);
return 0;
}

```

Broadcasting(All 5)

```
HP@DESKTOP-7M53U1E /cygdrive/d/1NITT/#Semester5/$NW Lab/Lab3
$ ./Vserver
All 5 client sockets accepted!
Msg1: KKR beat CSK by 10 runs
5
Broadcasting...
Msg2: KKR beat CSK by 10 runs

HP@DESKTOP-7M53U1E /cygdrive/d/1NITT/#Semester5/$NW Lab/Lab3
$ ./Vclient 0
Seq:1 Message recvd: KKR beat CSK by 10 runs

HP@DESKTOP-7M53U1E /cygdrive/d/1NITT/#Semester5/$NW Lab/Lab3
$ ./Vclient 1
Seq:1 Message recvd: KKR beat CSK by 10 runs

HP@DESKTOP-7M53U1E /cygdrive/d/1NITT/#Semester5/$NW Lab/Lab3
$ ./Vclient 2
Seq:1 Message recvd: KKR beat CSK by 10 runs

HP@DESKTOP-7M53U1E /cygdrive/d/1NITT/#Semester5/$NW Lab/Lab3
$ ./Vclient 3
Seq:1 Message recvd: KKR beat CSK by 10 runs

HP@DESKTOP-7M53U1E /cygdrive/d/1NITT/#Semester5/$NW Lab/Lab3
$ ./Vclient 4
Seq:1 Message recvd: KKR beat CSK by 10 runs
```

Multicasting(0,2,4)

```
HP@DESKTOP-7M53U1E /cygdrive/d/1NITT/#Semester5/$NW Lab/Lab3
$ ./Vserver
All 5 client sockets accepted!
Msg1: KKR beat CSK by 10 runs
5
Broadcasting...
Msg2: KKR beat CSK by 10 runs
3
0 2 4
Multicasting to: 0 2 4
Msg3: KKR beat CSK by 10 runs

HP@DESKTOP-7M53U1E /cygdrive/d/1NITT/#Semester5/$NW Lab/Lab3
$ ./Vclient 0
Seq:1 Message recvd: KKR beat CSK by 10 runs
Seq:2 Message recvd: KKR beat CSK by 10 runs

HP@DESKTOP-7M53U1E /cygdrive/d/1NITT/#Semester5/$NW Lab/Lab3
$ ./Vclient 1
Seq:1 Message recvd: KKR beat CSK by 10 runs

HP@DESKTOP-7M53U1E /cygdrive/d/1NITT/#Semester5/$NW Lab/Lab3
$ ./Vclient 2
Seq:1 Message recvd: KKR beat CSK by 10 runs
Seq:2 Message recvd: KKR beat CSK by 10 runs

HP@DESKTOP-7M53U1E /cygdrive/d/1NITT/#Semester5/$NW Lab/Lab3
$ ./Vclient 3
Seq:1 Message recvd: KKR beat CSK by 10 runs

HP@DESKTOP-7M53U1E /cygdrive/d/1NITT/#Semester5/$NW Lab/Lab3
$ ./Vclient 4
Seq:1 Message recvd: KKR beat CSK by 10 runs
Seq:2 Message recvd: KKR beat CSK by 10 runs
```

Multicasting(3,4)

```
HP@DESKTOP-7M53U1E /cygdrive/d/1NITT/#Semester5/$NW Lab/Lab3
$ ./Vserver
All 5 client sockets accepted!
Msg1: KKR beat CSK by 10 runs
5
Broadcasting...
Msg2: KKR beat CSK by 10 runs
3
0 2 4
Multicasting to: 0 2 4
Msg3: KKR beat CSK by 10 runs
2
3 4
Multicasting to: 3 4
Msg4: KKR beat CSK by 10 runs
```

```
HP@DESKTOP-7M53U1E /cygdrive/d/1NITT/#Semester5/$NW Lab/Lab3
$ ./Vclient 0
Seq:1 Message recvd: KKR beat CSK by 10 runs
Seq:2 Message recvd: KKR beat CSK by 10 runs

HP@DESKTOP-7M53U1E /cygdrive/d/1NITT/#Semester5/$NW Lab/Lab3
$ ./Vclient 1
Seq:1 Message recvd: KKR beat CSK by 10 runs

HP@DESKTOP-7M53U1E /cygdrive/d/1NITT/#Semester5/$NW Lab/Lab3
$ ./Vclient 2
Seq:1 Message recvd: KKR beat CSK by 10 runs
Seq:2 Message recvd: KKR beat CSK by 10 runs

HP@DESKTOP-7M53U1E /cygdrive/d/1NITT/#Semester5/$NW Lab/Lab3
$ ./Vclient 3
Seq:1 Message recvd: KKR beat CSK by 10 runs
Seq:3 Message recvd: KKR beat CSK by 10 runs

HP@DESKTOP-7M53U1E /cygdrive/d/1NITT/#Semester5/$NW Lab/Lab3
$ ./Vclient 4
Seq:1 Message recvd: KKR beat CSK by 10 runs
Seq:2 Message recvd: KKR beat CSK by 10 runs
Seq:3 Message recvd: KKR beat CSK by 10 runs
```