



# **FINAL PROJECT**

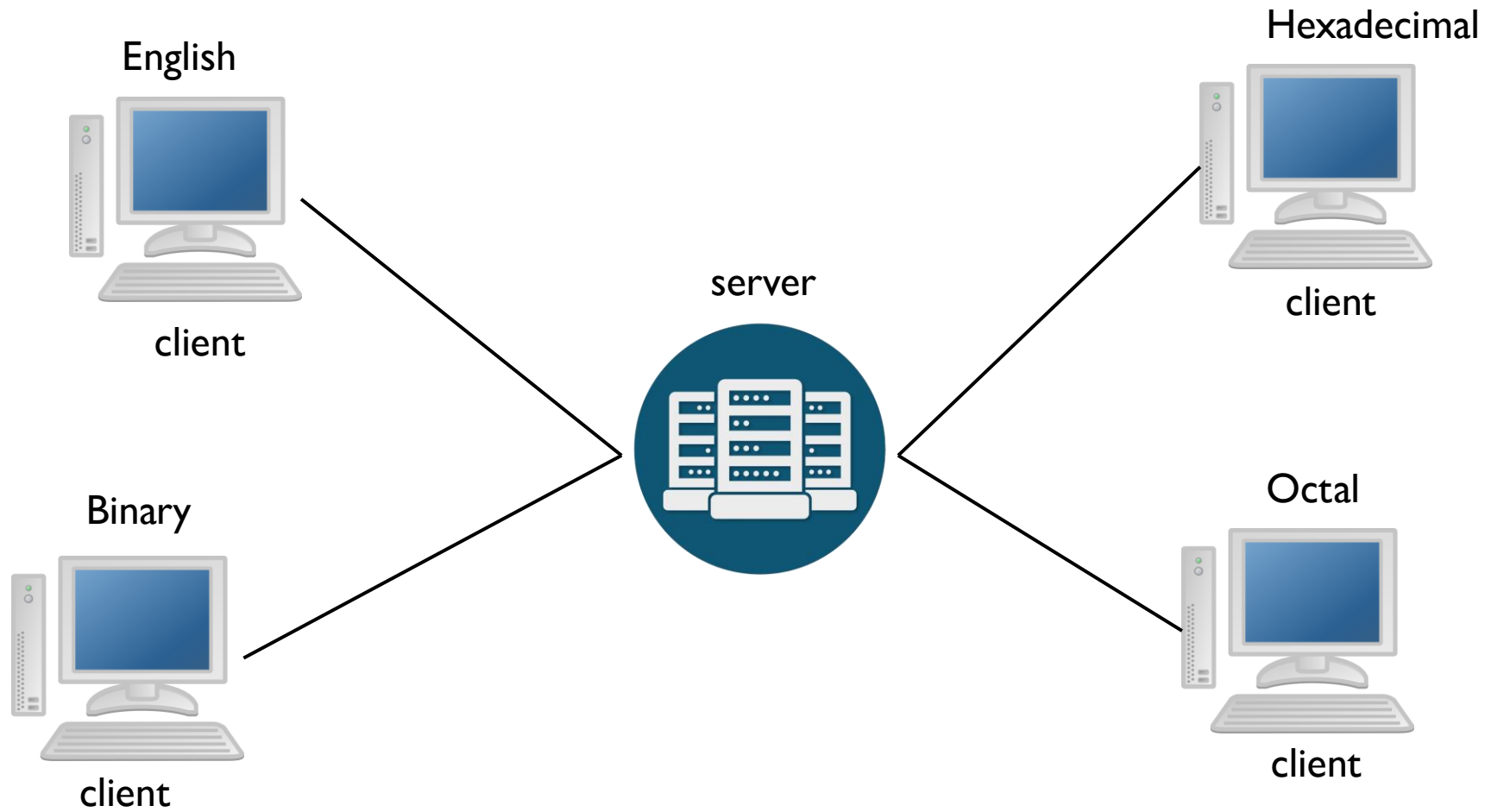
# **TRANSLATE PUBLIC CHAT**

**OHAV & IDAN**

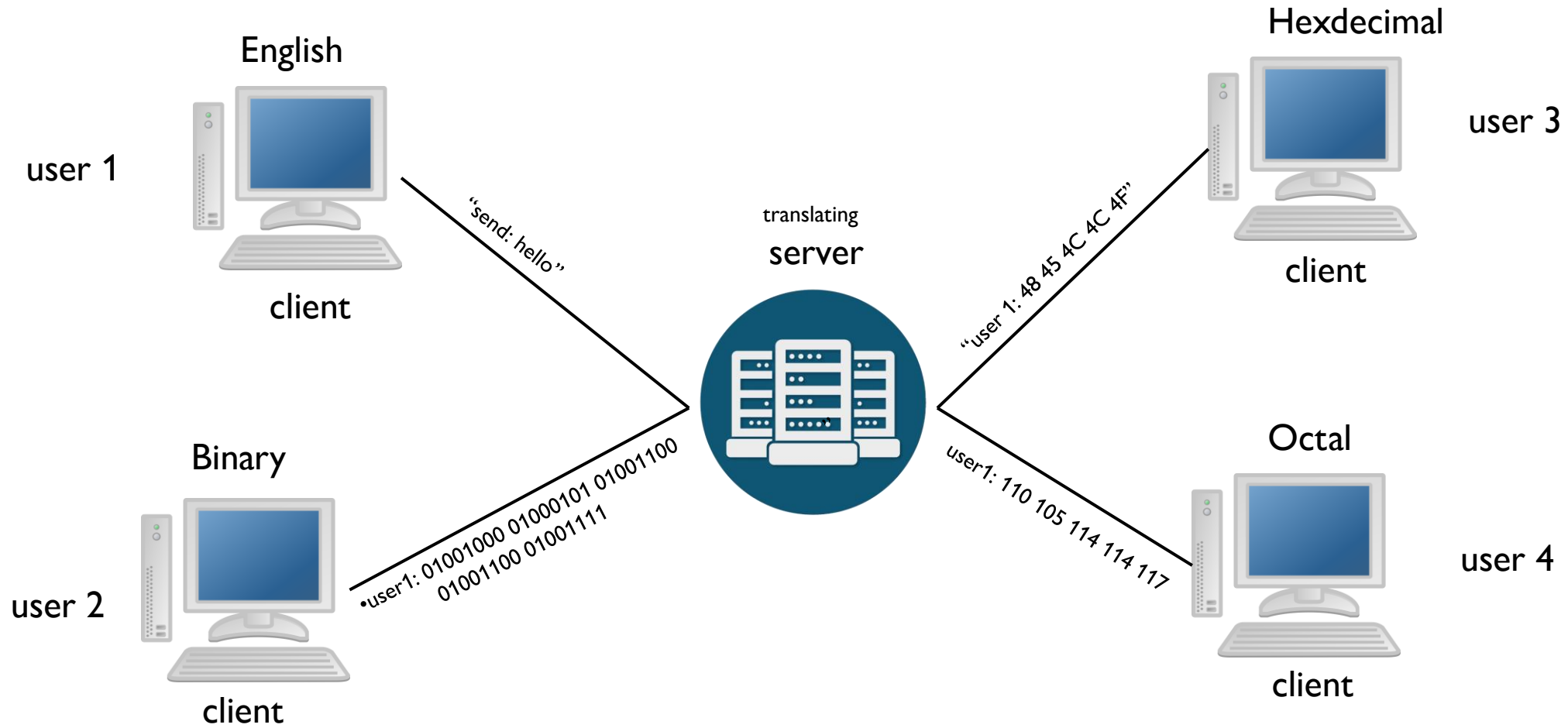
# Main Idea

- Public chat system with multiple clients
- Each client uses a unique language
- Messages are automatically translated
- Each client reads messages in their own language

# Client-Server Model



# Demonstration Of Application







# NETWORK PROTOCOL MAIN IDEAS

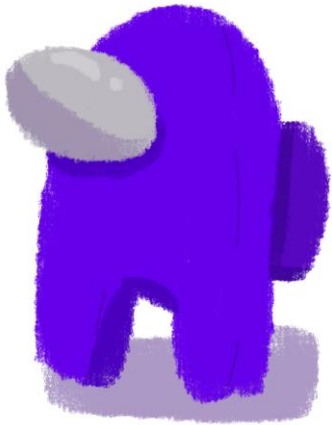
# Keep Alive And ACK

- Keep-alive with the server, each 30 seconds.
- Valid for 60 seconds – half of time
- check if there is connection and the connection is stable
- ACK response from server



# Authentication

- Check if it's the real client using authentication.
- Comparing by ID
- If not, disconnect the client from chat.



This is not user 3



User 3 message



user 1

# Check if Multicast Message Arrived

- Unicast send alongside multicast
- Maintain multicast message reliability
- If more than 5 multicast messages fall in a row, client close socket.
- Note:  
multicast on UDP and unicast is on TCP,

This is not user 3



multicast



unicast



user 1

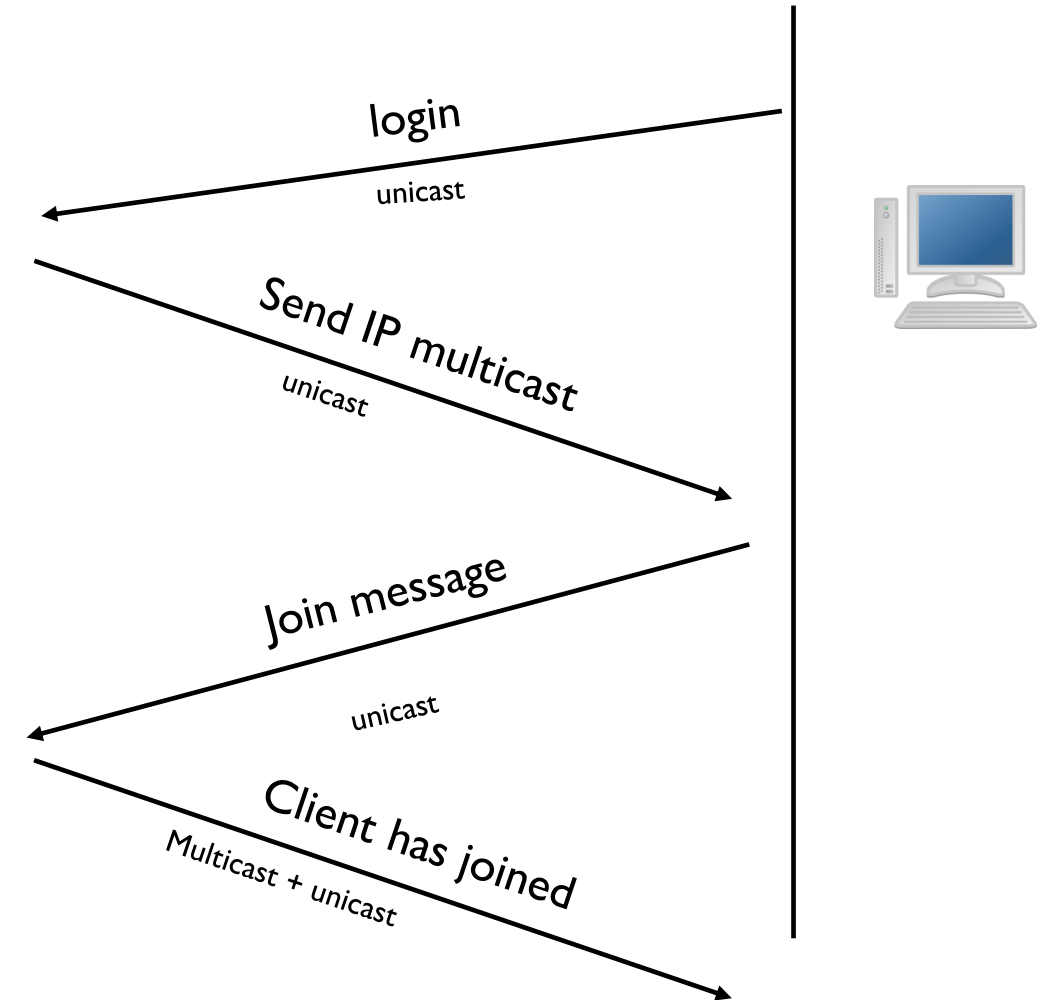
Five messages of multicast  
didn't arrive, exit



# Establish

When client connect to server the protocol is in establish state .

- The client sent login message
- verify, send the multicast ip (chat entrance)
- The client send Login confirm message (Join)
- The server add the client to users mangment
- The server send new join multicast



# Protocol Messages

- Struct message : unicast message

Type	ID	Language	Size-Payload	Payload
Type of command	ID number	Language number	Size of payload	Message data

- Struct multicast message :

Binary payload	Hexadecimal payload	English payload	Octal payload
Message in binary translated	Message in hexadecimal translated	Message in English translated	Message in octal translated

\* If there is no client in the room that speaks a specific language, the unused language field is empty

# Server commands

Command	No.	Porpus
Login	1	accept registration data of client
JOIN_Message	3	accept join confirm of the client
Send_message	4	send meessage to chat group
Exit	6	accept Exit and send ack_exit message
Keep_alive	7	accept keep alive message
No_LOG	9	accept message indicate trouble in the establishment

# Client commands

Command	No.	Porpus
multicast_indicator	10	multicast message didn't arrive
Authentication	9	failed authenticate user
Get_List	5	get list of online
Get_Multicast	2	get multicast message
Ack_exit	8	disconnect
LOGIN	1	login

The image features a blurred background of server racks with glowing green and purple lights. Overlaid in the center is the text "QA" in a large, white, sans-serif font. The letters are bold and clear against the dark, out-of-focus background.

QA

```

case Get_Multicast:
    printf("Get multicast\n");

    parse_multicast_ip_and_join(recv.payload);
    struct_message join;
    //join.id = client_struct.id;
    join.id = 3;
    join.laguage = language;

```

# Authentication

- An imposter client was manually set to be client ID 3.
- The server detected the impersonation attempt.
- An authentication issue was raised by the server.

```

cse_student@09lin-10: ~
cse_student@09lin-10:~$ ./client20^C
cse_student@09lin-10:~$ gcc /home/cse_student/Desktop/idan_client.c -o client20
-lpthread
cse_student@09lin-10:~$ ./client20
send LOGIN
Enter your name: idan
Enter a number for your language from the list:
0 : binary, 1 : english, 2 : exadecimal , 3 : octal
1
Get multicast
Multicast IP Address: 239.0.0.1
you're in the chat.
Numeric IP Address: 239.0.0.1
send join message
Welcome to Chat!
We invite you to send messages.
If you want to see who is logged in, please enter LIST.
If you want to exit, please enter EXIT.
Otherwise, send a message.
Enter a message:
cse_student@09lin-10:~$ █

cse_student@09lin-10: ~
cse_student@09lin-10:~$ ./server20
Server listening on port 8080
^C
cse_student@09lin-10:~$ gcc /home/cse_student/Desktop/idan_server.c -o server20
-lpthread
cse_student@09lin-10:~$ ./server20
Server listening on port 8080
Connection accepted
send GET LOGIN command
idan
User 1: idan
User 1 logged in with name 'idan' and language 'english'
Multicast server listening on 239.0.0.1:5007
sending multicast ip

user autentication failed
cse_student@09lin-10:~$ █

```



# Multicast Message Loss

```
}  
  
}  
sleep(0.5);  
//disable multicast send message  
// if (sendto(mult.sockfd, &send, sizeof(send), 0, (struct sockaddr *)&mult.multicast_addr, sizeof(mult.multicast_addr)) < 0) {  
//     perror("sendto");  
// }  
}
```

- Multicast was disabled to observe protocol handling
- After sending 5 multicast messages, the socket was closed

The image shows two terminal windows side-by-side, illustrating a chat application's behavior when multicast is disabled.

**Left Terminal (Client):**

```
cse_student@09lin-10: ~  
cse_student@09lin-10:~$ ./client20  
send LOGIN  
Enter your name: idan  
Enter a number for your language from the list:  
0 : binary, 1 : english, 2 : hexadecimal , 3 : octal  
1  
Get multicast  
Multicast IP Address: 239.0.0.1  
you're in the chat.  
Numeric IP Address: 239.0.0.1  
send join message  
Welcome to Chat!  
We invite you to send messages.  
If you want to see who is logged in, please enter LIST.  
If you want to exit, please enter EXIT.  
Otherwise, send a message.  
Enter a message:  
Received: User 1 logged in with name 'idan' and language 'english'  
  
hello  
you send: hello  
Enter a message:  
message didnt arrive.  
try  
you send: try  
Enter a message:  
message didnt arrive.  
l  
you send: l  
Enter a message:  
message didnt arrive.  
work?  
you send: work?  
Enter a message:  
message didnt arrive.  
idan  
you send: idan  
Enter a message:  
message didnt arrive.  
why im no gett a message  
you send: why im no gett a message  
Enter a message:  
message didnt arrive.  
more than 5 message didnt arrive, close socket.  
cse_student@09lin-10:~$ ^C  
cse_student@09lin-10:~$
```

**Right Terminal (Server):**

```
cse_student@09lin-10:~  
cse_student@09lin-10:~$ ./server20  
sending multicast ip  
idan_ user authentication passed  
es(v SERVER GET JOIN MESSAGE  
uid:1  
k; Keep alive  
hello  
tica Keep alive  
eadf Keep alive  
imev Keep alive  
Srea Keep alive  
ulti Keep alive  
try  
et t Keep alive  
out. Keep alive  
out.l  
ait work?  
ait Keep alive  
acti Keep alive  
acti Keep alive  
perr Keep alive  
brea Keep alive  
lse idan  
prin Keep alive  
coun Keep alive  
if (Keep alive  
why im no gett a message  
Keep alive  
cse_student@09lin-10:~$ ^C  
cse_student@09lin-10:~$
```



# DEMONSTRATION

```
ack
multicast arriving
Received: 01101000 01101001
ack
hi
you send: 01101000 01101001
Enter a message:
multicast arriving
Received: 01101000 01101001
ack
ack
whhhow areack
you
you send: 01110111 01101000 01101000 01101111 01110111 00100000 01100001 0111001
0 01100101 00100000 01111001 01101111 01110101
Enter a message:
multicast arriving
Received: 01110111 01101000 01101000 01101111 01110111 00100000 01100001 0111001
0 01100101 00100000 01111001 01101111 01110101
ack
ack
ack
^[Sack
^[Sack
ack
^[S^[Sack
ack
ack
ack
```

```
pc3 (Starting point) [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
multicast arriving
Received: hi
ack
multicast arriving
Received: hi
ack
ack
ack
multicast arriving
Received: whhhow are you
ack
ack
ack
ack
ack
ack
ack
LIST
Enter a message:
GET LIST
5-----
The user online chat is:
user 1, idan, binary
user 2, ohav, english
user 3, TOT0, hexadecimal
-----
ack
^[Sack
```

# 3 CLIENT CHAT

```
pc5-GUI Clone [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
[Software Updater] Terminal - ubu@pc5-GUI: ~...
Terminal - ubu@pc5-GUI: ~/Desktop
File Edit View Terminal Tabs Help
Keep alive
Keep alive
Keep alive
Keep alive
Keep alive
Keep alive
user 1, idan, binary
user 2, ohav, english
user 3, TOT0, hexadecimal
Keep alive
Keep alive
Keep alive
Keep alive
```

```
pc2 (Starting point) [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Enter a message:
multicast arriving
Received: 68 65 6C
Received: 68 65 6C
ack
hiack
you send: 68 69
Enter a message:
multicast arriving
Received: 68 69
ack
multicast arriving
Received: 68 69
ack
ack
ack
multicast arriving
Received: 77 68 68 6F 77 20 61 72 65 20 79 6F 75
ack
ack
ack
ack
```

No.	Time	Source	Destination	Protocol	Length	Info
4	10:01:31.573095	192.6.3.254	224.0.0.13	PIMv2	130	Bootstrap
5	10:01:53.418672	192.6.1.1	192.6.3.1	TCP	74	47921 → 8080 [SYN] Seq=0 Win=29200 Len=0 MSS=1460 SAC
6	10:01:53.419647	192.6.3.1	192.6.1.1	TCP	74	8080 → 47921 [SYN, ACK] Seq=0 Ack=1 Win=28960 Len=0 M
7	10:01:53.461636	192.6.1.1	192.6.3.1	TCP	66	47921 → 8080 [ACK] Seq=1 Ack=1 Win=29216 Len=0 TSval=
8	10:01:53.462610	192.6.3.1	192.6.1.1	TCP	1082	8080 → 47921 [PSH, ACK] Seq=1 Ack=1 Win=29056 Len=101
9	10:01:53.493759	192.6.1.1	192.6.3.1	TCP	66	47921 → 8080 [ACK] Seq=1 Ack=1017 Win=32096 Len=0 TSv
10	10:01:57.260750	192.6.1.1	192.6.3.1	TCP	1082	47921 → 8080 [PSH, ACK] Seq=1 Ack=1017 Win=32096 Len=
11	10:01:57.260750	192.6.3.1	192.6.1.1	TCP	66	8080 → 47921 [ACK] Seq=1017 Ack=1017 Win=31872 Len=0
12	10:01:59.260628	192.6.3.1	192.6.1.1	TCP	1082	8080 → 47921 [PSH, ACK] Seq=1017 Ack=1017 Win=31872 L
13	10:01:59.283018	192.6.1.1	192.6.3.1	TCP	66	47921 → 8080 [ACK] Seq=1017 Ack=2033 Win=35008 Len=0
14	10:01:59.293725	192.6.1.1	192.6.3.1	TCP	1082	47921 → 8080 [PSH, ACK] Seq=1017 Ack=2033 Win=35008 L

- > Frame 9: 66 bytes on wire (528 bits), 66 bytes captured (528 bits) on interface -, id 0
- > Ethernet II, Src: c4:04:28:50:00:00 (c4:04:28:50:00:00), Dst: PcsCompu\_42:e2:35 (08:00:27:42:e2:35)
- > Internet Protocol Version 4, Src: 192.6.1.1, Dst: 192.6.3.1
- ▼ Transmission Control Protocol, Src Port: 47921, Dst Port: 8080, Seq: 1, Ack: 1017, Len: 0

Source Port: 47921

Destination Port: 8080

[Stream index: 0]

[TCP Segment Len: 0]

Sequence Number: 1 (relative sequence number)

Sequence Number (raw): 234616143

[Next Sequence Number: 1 (relative sequence number)]

Acknowledgment Number: 1017 (relative ack number)

Acknowledgment number (raw): 3119121050

# WIRESHARK OBSERVATIONS

```

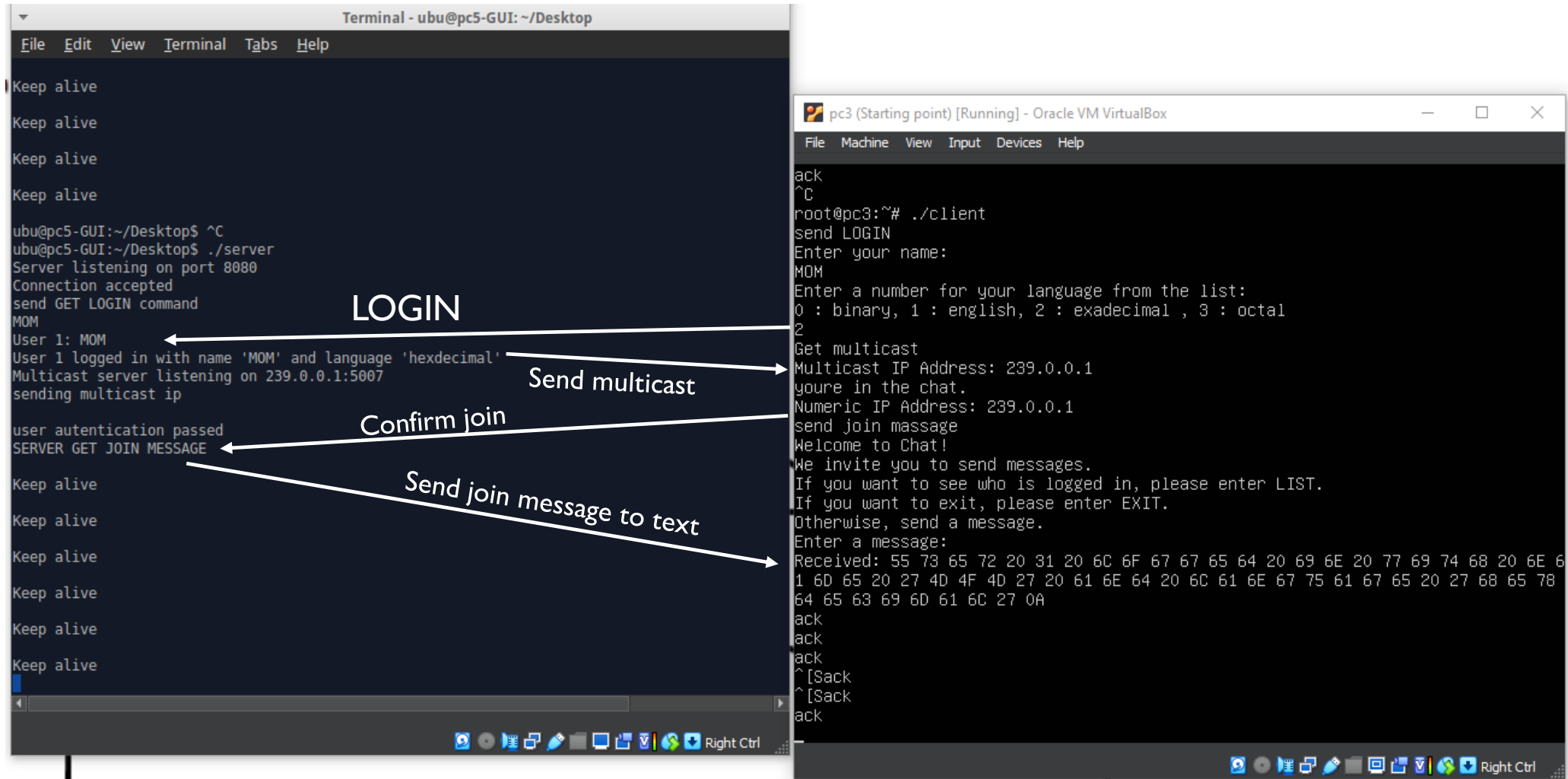
0000  08 00 27 42 e2 35 c4 04 28 50 00 00 08 00 45 00  ..'B.5.. (P....E.
0010  00 34 4f c7 40 00 3e 06 68 ee c0 06 01 01 c0 06  .40 @.> h.....
0020  03 01 bb 31 1f 90 0d fb f5 4f b9 ea 02 9a 80 10  ..1... .O.....
0030  03 eb bd 9a 00 00 01 01 08 0a 00 00 ba 9e 00 02  ...
0040  db f6

```



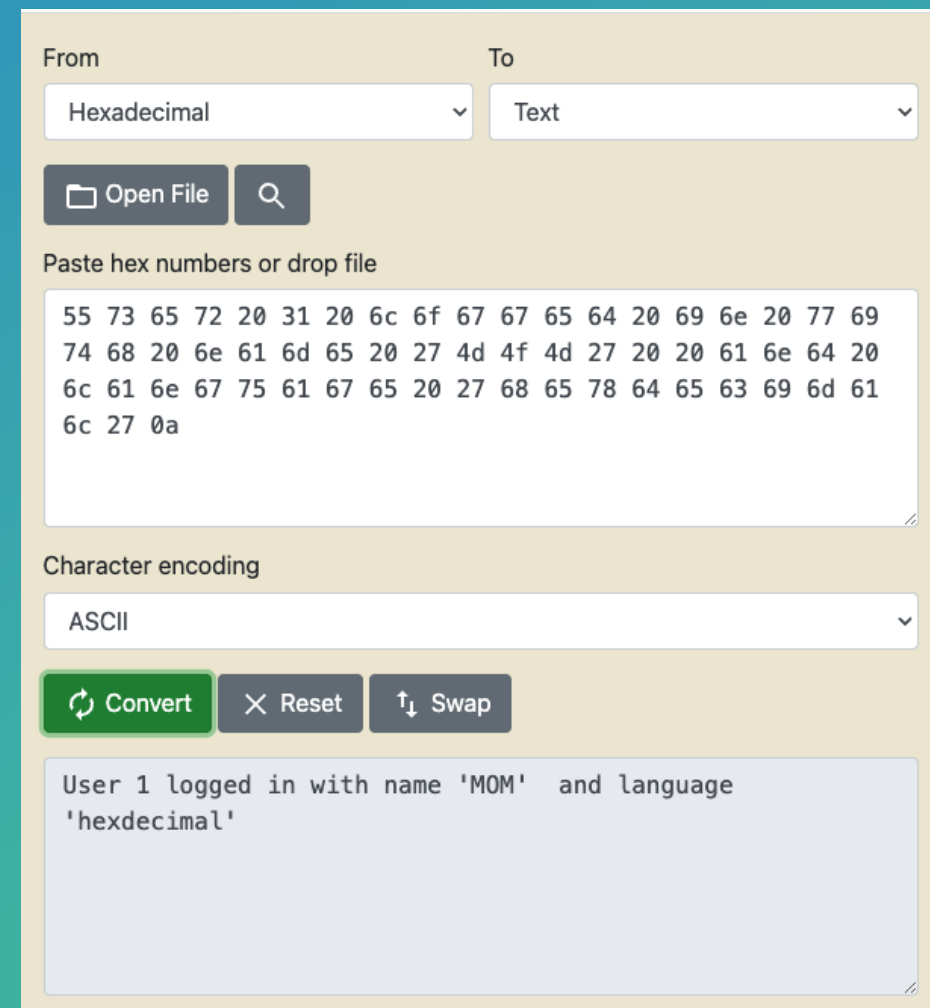
LOGIN COMMAND

# ESTABLISH





# WE SAVED YOU TIME ALON!



The image shows a web-based hex-to-text conversion tool. It features a 'From' dropdown set to 'Hexadecimal' and a 'To' dropdown set to 'Text'. Below these are buttons for 'Open File' and a search icon. A text area contains a block of hex data: 55 73 65 72 20 31 20 6c 6f 67 67 65 64 20 69 6e 20 77 69 74 68 20 6e 61 6d 65 20 27 4d 4f 4d 27 20 20 61 6e 64 20 6c 61 6e 67 75 61 67 65 20 27 68 65 78 64 65 63 69 6d 61 6c 27 0a. Below the text area is a 'Character encoding' dropdown set to 'ASCII'. At the bottom are three buttons: 'Convert' (green), 'Reset' (grey), and 'Swap' (grey). The output area at the bottom shows the converted text: 'User 1 logged in with name 'MOM' and language 'hexdecimal''. In the top right corner of the overall image, there is a white plus sign and a white circle.

From: Hexadecimal To: Text

Open File

Paste hex numbers or drop file

```
55 73 65 72 20 31 20 6c 6f 67 67 65 64 20 69 6e 20 77 69
74 68 20 6e 61 6d 65 20 27 4d 4f 4d 27 20 20 61 6e 64 20
6c 61 6e 67 75 61 67 65 20 27 68 65 78 64 65 63 69 6d 61
6c 27 0a
```

Character encoding: ASCII

Convert Reset Swap

User 1 logged in with name 'MOM' and language 'hexdecimal'



# CONVERSATION

+

•

○

+

○

•

# OBSERVATIONS

- In the end of the videos the server continue working even if there is no clients in the chat

+ chat conversation

- List of update users
- Establish process
- Exit and enter multicast messages





```
pc4 (Starting point) [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
root@pc4:~# gcc gns_client2.c -o gns_client2 -lpthread
root@pc4:~#
```

```
pc3 (Starting point) [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
root@pc3:~# gcc gns_client2.c -lpthread
root@pc3:~#
```

```
pc5-GUI Clone [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
read
gns_server2.c: In function 'close_server':
gns_server2.c:1034:17: error: 'for' loop initial declarations are only allowed in C99 mode
    for (int i = 0; i < client_count; i++) {
                  ^
gns_server2.c:1034:17: note: use option -std=c99 or -std=gnu99 to compile your code
gns_server2.c: In function 'main':
gns_server2.c:1126:9: warning: passing argument 3 of 'pthread_create' from incompatible pointer type [enabled by default]
    if (pthread_create(&tid, NULL, close_server, (void *)new_user) != 0) {
        ^
In file included from gns_server2.c:10:0:
/usr/include/pthread.h:244:12: note: expected 'void * (*) (void *)' but argument is of type 'void (*) (void *)'
    extern int pthread_create(pthread_t * __restrict __newthread,
                          ^
root@pc5-GUI: /home/ubu/Desktop/ohav_idan# gcc gns_server2.c -o gns_server2 -lpthread
root@pc5-GUI: /home/ubu/Desktop/ohav_idan#
    close(mult.sockfd);
    int i;
    for (i = 0; i < client_count; i++) {
        close(clients[i].socket);
    }
    close(server_socket);
```

## Console

GNS3 management console.  
Running GNS3 version 2.2.29 on Windows (64-bit) with Python 3.10.0  
Copyright (c) 2006-2024 GNS3 Technologies.  
Use Help -> GNS3 Doctor to detect common issues.

=> Timeout after 5 seconds for request http://admin@localhost:3080/v2/version. Please check the connection is not blocked by a firewall or an anti-virus.  
Changing the number of adapters while links are connected isn't supported yet! Please delete all the links first.

```
pc2 (Starting point) [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
(failed reverse-i-search) 'gcc': pin^C192.6.3.1
root@pc2:~# ^C
root@pc2:~# ls
client  gns_client2.c  gns_client.c
root@pc2:~# gcc gns_client2.c -o gns_client2 -lpthread
/tmp/ccB0zcHb.o: In function 'setup_multicast_receiver':
gns_client2.c:(.text+0x1034): undefined reference to 'pthread_create'
/tmp/ccB0zcHb.o: In function 'receive_messages':
gns_client2.c:(.text+0x17fa): undefined reference to 'pthread_create'
gns_client2.c:(.text+0x183c): undefined reference to 'pthread_create'
/tmp/ccB0zcHb.o: In function 'main':
gns_client2.c:(.text+0x1c1a): undefined reference to 'pthread_create'
collect2: error: ld returned 1 exit status
root@pc2:~# ls
client  gns_client2.c  gns_client.c
root@pc2:~# gcc gns_client2.c -o gns_client2 -lpthread
/tmp/ccxVBtA5.o: In function 'setup_multicast_receiver':
gns_client2.c:(.text+0x1034): undefined reference to 'pthread_create'
/tmp/ccxVBtA5.o: In function 'receive_messages':
gns_client2.c:(.text+0x17fa): undefined reference to 'pthread_create'
gns_client2.c:(.text+0x183c): undefined reference to 'pthread_create'
/tmp/ccxVBtA5.o: In function 'main':
gns_client2.c:(.text+0x1c1a): undefined reference to 'pthread_create'
collect2: error: ld returned 1 exit status
root@pc2:~# ls
client  gns_client2.c  gns_client.c
root@pc2:~# gcc gns_client2.c -o gns_client2 -lpthread
root@pc2:~#
```

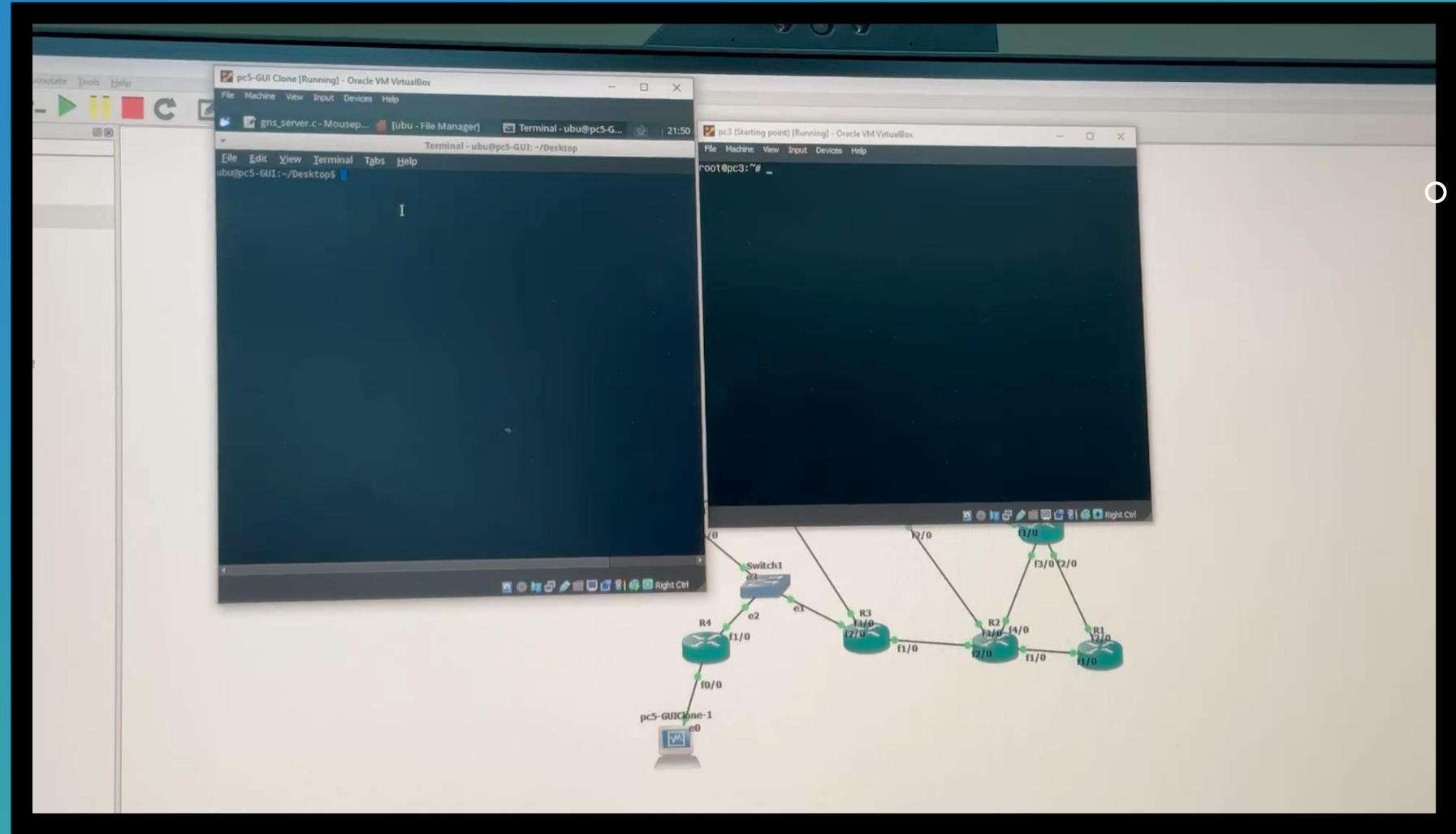
Ohav Tbul



## Servers Summary

DESKTOP-R01E4F9 CPU 4.3%, RAM 3...

CLIENT  
STOP  
WORKING  
IN  
ESTABLISH



**THANK  
YOU**



+

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