

## VM2/client1

```
pradeep207@pradeep207-VirtualBox: ~/Desktop/HW4
pradeep207@pradeep207-VirtualBox:~/Desktop/HW4$ ./udpchatclient 127.0.0.1 9191
CMPE 207 HW4 udpchatclient Bapugouda urf Pradeep Patil 277
Hello from Client 1
Hello from Client 1
Client 1-message 2
|Mon Oct 22 22:21:14 2018| <127.0.0.1> :server line 1

|Mon Oct 22 22:21:21 2018| <127.0.0.1> :server line 2

|Mon Oct 22 22:21:30 2018| <127.0.0.1> :server line 3

client 1 message 3
█
```

## VM2/client2 (both old and new client2)

```
pradeep207@pradeep207-VirtualBox: ~/Desktop/HW4
pradeep207@pradeep207-VirtualBox:~/Desktop/HW4$ ./udpchatclient 127.0.0.1 9191
CMPE 207 HW4 udpchatclient Bapugouda urf Pradeep Patil 277
Hello from client 2
|Mon Oct 22 22:18:47 2018| <127.0.0.1> :<<ServerBusy>>

pradeep207@pradeep207-VirtualBox:~/Desktop/HW4$ ./udpchatclient 127.0.0.1 9191
CMPE 207 HW4 udpchatclient Bapugouda urf Pradeep Patil 277
Hello again from client 2
|Mon Oct 22 22:23:28 2018| <127.0.0.1> :<<ServerBusy>>

pradeep207@pradeep207-VirtualBox:~/Desktop/HW4$
```

- VM1/server

```
pradeep207@pradeep207-VirtualBox: ~/Desktop/HW4
pradeep207@pradeep207-VirtualBox:~/Desktop/HW4$ ./udpchatsvr
CMPE 207 HW3 udpchat Bapugouda urf Pradeep Patil 011483277

|Mon Oct 22 22:17:37 2018| <0.0.0.0> :Hello from Client 1
|Mon Oct 22 22:17:50 2018| <127.0.0.1> :Hello from Client 1
|Mon Oct 22 22:19:54 2018| <127.0.0.1> :Client 1-message 2

server line 1
server line 2
server line 3
|Mon Oct 22 22:22:42 2018| <127.0.0.1> :client 1 message 3
```

- VM1/other-shell

```
pradeep207@pradeep207-VirtualBox: ~
unix  2      [ ]          DGRAM           19782
unix  3      [ ]          DGRAM           21733
unix  2      [ ]          DGRAM           22456
unix  2      [ ]          DGRAM           41629
unix  2      [ ]          DGRAM           22722
pradeep207@pradeep207-VirtualBox:~$ ps -fL -C udpchatsvr
UID          PID    PPID    LWP   C   NLWP   STIME TTY          TIME CMD
pradeep+  11716  11705  11716   0     1  22:14 pts/0    00:00:00 ./udpchatsvr
pradeep207@pradeep207-VirtualBox:~$ ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 08:00:27:5a:57:2d brd ff:ff:ff:ff:ff:ff
    inet 192.168.240.3/24 brd 192.168.240.255 scope global dynamic enp0s3
        valid_lft 1176sec preferred_lft 1176sec
    inet6 fe80::a344:57c2:b6dd:6995/64 scope link
        valid_lft forever preferred_lft forever
pradeep207@pradeep207-VirtualBox:~$
```

```
pradeep207@pradeep207-VirtualBox: ~
pradeep207@pradeep207-VirtualBox:~$ netstat ul | grep "udpchat"
pradeep207@pradeep207-VirtualBox:~$ netstat ul | grep "Dgram"
pradeep207@pradeep207-VirtualBox:~$ netstat ul | grep "DGRAM"
unix  3      [ ]          DGRAM           11818    /run/systemd/notify
unix  2      [ ]          DGRAM           11825    /run/systemd/journal/syslog
unix  7      [ ]          DGRAM           11831    /run/systemd/journal/socket
unix 18      [ ]          DGRAM           11834    /run/systemd/journal/dev-log
unix  2      [ ]          DGRAM           18847    /run/user/1000/systemd/notify
unix  3      [ ]          DGRAM           12554
unix  3      [ ]          DGRAM           12555
unix  2      [ ]          DGRAM           12244
unix  3      [ ]          DGRAM           13875
unix  2      [ ]          DGRAM           18709
unix  2      [ ]          DGRAM           18165
unix  2      [ ]          DGRAM           22023
unix  2      [ ]          DGRAM           13871
unix  2      [ ]          DGRAM           12256
unix  3      [ ]          DGRAM           13876
unix  3      [ ]          DGRAM           13877
unix  3      [ ]          DGRAM           13878
unix  2      [ ]          DGRAM           17235
unix  2      [ ]          DGRAM           18835
unix  2      [ ]          DGRAM           18826
unix  2      [ ]          DGRAM           15674
unix  2      [ ]          DGRAM           30062
unix  2      [ ]          DGRAM           19568
unix  2      [ ]          DGRAM           22695
unix  2      [ ]          DGRAM           15703
unix  2      [ ]          DGRAM           16791
unix  2      [ ]          DGRAM           12518
unix  2      [ ]          DGRAM           17258
unix  2      [ ]          DGRAM           15734
unix  2      [ ]          DGRAM           16820
unix  3      [ ]          DGRAM           21734
unix  2      [ ]          DGRAM           19782
unix  3      [ ]          DGRAM           21733
unix  2      [ ]          DGRAM           22456
unix  2      [ ]          DGRAM           41629
```

4. (10 pts) Given a UDP client on US west coast sends messages received by a UDP server on US east coast. UDP is unreliable and the packet can be lost on its way out (on client machine), lost in transit, and lost on its way in (on the server). For each of these three cases, give a specific scenario to illustrate why the UDP packet can be lost.

Answer:

**On its way out (on client machine):**

If the **socket send buffer** is lesser than the number of packets (UDP Packet) in the queue and the network card is slow and cannot handle huge traffic the packets are dropped by the operating system / kernel.

**lost in transit:**

**Congestion**, Hardware capacity and bottlenecks or faulty links may cause the packets to be dropped in the in the internet. This can happen at routers and nodes. Since UDP is connectionless no retransmission happens when a packet is lost or dropped.

**lost on its way in (on the server):**

A **socket receive buffer** carries the incoming packets on a machine, then the server application reads packets out of that buffer and handles them. If the server buffer gets full, the packets get dropped.