

Assignment-2

Answer-3

The following are the time required to server all the clients in the various implementations

```
keshav@keshav-HP-Laptop-15-da1xxx:~/Desktop/Assignment-2/SequentialClientServer$ ./server.out
Time Elapsed to handle all clients are: 2266
keshav@keshav-HP-Laptop-15-da1xxx:~/Desktop/Assignment-2/SequentialClientServer$ █
```

Sequential Client Server

```
keshav@keshav-HP-Laptop-15-da1xxx:~/Desktop/Assignment-2/ThreadedClientServer$ ./server.out
Time Elapsed to handle all clients are: 3804
keshav@keshav-HP-Laptop-15-da1xxx:~/Desktop/Assignment-2/ThreadedClientServer$ █
```

Thread Client Server

```
keshav@keshav-HP-Laptop-15-da1xxx:~/Desktop/Assignment-2/ProcessClientServer$ ./server.out
Time Elapsed to handle all clients are: 3320
keshav@keshav-HP-Laptop-15-da1xxx:~/Desktop/Assignment-2/ProcessClientServer$ █
```

Process Client Server

```
keshav@keshav-HP-Laptop-15-da1xxx:~/Desktop/Assignment-2/SelectClientServer$ ./server.out
Time Elapsed to handle all clients are: 2412
keshav@keshav-HP-Laptop-15-da1xxx:~/Desktop/Assignment-2/SelectClientServer$ █
```

Select Client Server

```
keshav@keshav-HP-Laptop-15-da1xxx:~/Desktop/Assignment-2/PollClientServer$ ./server.out
Time Elapsed to handle all clients are: 4707
keshav@keshav-HP-Laptop-15-da1xxx:~/Desktop/Assignment-2/PollClientServer$ █
```

Poll Client Server

```
keshav@keshav-HP-Laptop-15-da1xxx:~/Desktop/Assignment-2/EpollClientServer$ ./server.out
Time Elapsed to handle all clients are: 3375
keshav@keshav-HP-Laptop-15-da1xxx:~/Desktop/Assignment-2/EpollClientServer$
```

Epoll Client Server

The following are the CPU and memory utilization screenshots for various implementations

```
1 top - 20:30:04 up 7:40, 1 user, load average: 0.70, 1.01, 1.07
2 Tasks: 1 total, 0 running, 1 sleeping, 0 stopped, 0 zombie
3 %Cpu(s): 7.6 us, 1.7 sy, 0.0 ni, 90.8 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
4 MiB Mem : 7827.1 total, 3566.4 free, 1941.9 used, 2318.7 buff/cache
5 MiB Swap: 0.0 total, 0.0 free, 0.0 used. 4995.9 avail Mem
6
7 PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
8 33058 keshav 20 0 6052 1916 1744 S 0.0 0.0 0:00.00 server.+
9
10 top - 20:30:05 up 7:40, 1 user, load average: 0.64, 0.99, 1.06
11 Tasks: 1 total, 0 running, 1 sleeping, 0 stopped, 0 zombie
12 %Cpu(s): 7.8 us, 1.5 sy, 0.0 ni, 90.2 id, 0.0 wa, 0.0 hi, 0.5 si, 0.0 st
13 MiB Mem : 7827.1 total, 3566.4 free, 1941.9 used, 2318.7 buff/cache
14 MiB Swap: 0.0 total, 0.0 free, 0.0 used. 4995.9 avail Mem
15
16 PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
17 33058 keshav 20 0 6052 1916 1744 S 0.0 0.0 0:00.00 server.+
18
```

Threaded Server Client

```
1 top - 20:35:27 up 7:46, 1 user, load average: 0.57, 0.76, 0.94
2 Tasks: 1 total, 0 running, 1 sleeping, 0 stopped, 0 zombie
3 %Cpu(s): 7.3 us, 1.6 sy, 0.0 ni, 91.1 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
4 MiB Mem : 7827.1 total, 3556.8 free, 1915.7 used, 2354.6 buff/cache
5 MiB Swap: 0.0 total, 0.0 free, 0.0 used. 4996.4 avail Mem
6
7 PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
8 33328 keshav 20 0 6052 1924 1748 S 0.0 0.0 0:00.00 server.+
9
```

Process Server Client

```
1 top - 20:36:42 up 7:47, 1 user, load average: 0.46, 0.68, 0.90
2 Tasks: 1 total, 0 running, 1 sleeping, 0 stopped, 0 zombie
3 %Cpu(s): 10.7 us, 0.8 sy, 0.0 ni, 88.5 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
4 MiB Mem : 7827.1 total, 3553.2 free, 1915.3 used, 2358.5 buff/cache
5 MiB Swap: 0.0 total, 0.0 free, 0.0 used. 4993.4 avail Mem
6
7 PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
8 33389 keshav 20 0 6064 1932 1756 S 0.0 0.0 0:00.00 server.+
9
```

Select Server Client

```

1 top - 20:37:59 up 7:48, 1 user, load average: 0.82, 0.74, 0.90
2 Tasks: 1 total, 1 running, 0 sleeping, 0 stopped, 0 zombie
3 %Cpu(s): 6.7 us, 10.0 sy, 0.0 ni, 83.3 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
4 MiB Mem : 7827.1 total, 3550.1 free, 1921.7 used, 2355.3 buff/cache
5 MiB Swap: 0.0 total, 0.0 free, 0.0 used. 4991.0 avail Mem
6
7 PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
8 33440 keshav 20 0 6064 1924 1752 R 100.0 0.0 0:26.33 server.+
9
10 top - 20:38:00 up 7:48, 1 user, load average: 0.82, 0.74, 0.90
11 Tasks: 1 total, 1 running, 0 sleeping, 0 stopped, 0 zombie
12 %Cpu(s): 8.4 us, 9.5 sy, 0.0 ni, 82.0 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
13 MiB Mem : 7827.1 total, 3550.1 free, 1921.7 used, 2355.3 buff/cache
14 MiB Swap: 0.0 total, 0.0 free, 0.0 used. 4991.0 avail Mem
15
16 PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
17 33440 keshav 20 0 6064 1924 1752 R 100.0 0.0 0:27.34 server.+
18

```

Poll Server Client

```

1 top - 20:39:37 up 7:50, 1 user, load average: 0.85, 0.74, 0.89
2 Tasks: 1 total, 1 running, 0 sleeping, 0 stopped, 0 zombie
3 %Cpu(s): 11.1 us, 4.3 sy, 0.0 ni, 84.6 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
4 MiB Mem : 7827.1 total, 3558.4 free, 1910.0 used, 2358.7 buff/cache
5 MiB Swap: 0.0 total, 0.0 free, 0.0 used. 5000.9 avail Mem
6
7 PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
8 33491 keshav 20 0 6064 1920 1744 R 0.0 0.0 0:32.69 server.+
9
10 top - 20:39:38 up 7:50, 1 user, load average: 0.85, 0.74, 0.89
11 Tasks: 1 total, 1 running, 0 sleeping, 0 stopped, 0 zombie
12 %Cpu(s): 10.8 us, 6.8 sy, 0.0 ni, 82.3 id, 0.0 wa, 0.0 hi, 0.1 si, 0.0 st
13 MiB Mem : 7827.1 total, 3558.4 free, 1910.0 used, 2358.7 buff/cache
14 MiB Swap: 0.0 total, 0.0 free, 0.0 used. 5000.9 avail Mem
15
16 PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
17 33491 keshav 20 0 6064 1920 1744 R 0.0 0.0 0:33.69 server.+
18

```

Epoll Server Client