

DESIGN APPROACH

- Each process starts two threads, one thread listen to incoming request and other thread sends the connection request to processes
- Only one process is selected as a daemon process, based on a flag received from command line parameters, in the script only one process is passed flag as 1 which makes it a daemon process, other processes are passed flag other than 1.
- The other processes wait for accepting connections.
- The daemon process sends connection request to all the other processes including itself.
- When daemon establishes the connection with all processes, it sends its logical clock which is a random number
- All processes receive the logical time from daemon process and calculate the offset between their randomly generated logical time and the one received from daemon.
- All processes send this offset to the daemon.
- Daemon waits until it receives the offset from all the processes in the distributed system
- Daemon then calculates the average of all the offsets it received. And calculate offset for all the processes based on the average value and the offset it had received for the processes earlier. The offset can be negative or positive.
- Daemon sends the adjusted offsets to all processes.
- On receiving the adjusted offset, all processes add the adjusted offset to their clock.
- This way all processes gets synchronized to same logical clock.

Below screenshots shows that the clock of Daemon process and other processes is synchronized to 13620:

```
Connecting Socket
server thread
offset received-90
offset received-60
offset received-30
local clock: 13665

Time received from Deamon      13665
Offset sent to daemon        : 0
offset received0
logicalClock[j]: -90
logicalClock[j]: -60
logicalClock[j]: -30
logicalClock[j]: 0
noOfProcesses      : 4
Average is         : -45
logical clock at client was    : -90
Sending time to synchronize   : 45

logical clock at client was    : -60
Sending time to synchronize   : 15

logical clock at client was    : -30
Sending time to synchronize   : -15

logical clock at client was    : 0
Sending time to synchronize   : -45

Synchronized time is      : 13620
```

