RMI

Although easier to code, the networking side of the RMI was more difficult. This was due to the fact that the lab computers, which we assumed we could use, are connected by an enterprise network system; the network firewall does not allow TCP ports to be opened between two devices unless the user has root access. (This is not the case for UDP ports, and so we did not have this issue in UDP). As a result, we had to use our own laptops as servers. Due to the connection being TCP, we experienced no message loss, as seen in the diagram below. This was true even for the distance of the entire comp labs, hiding behind the wall. RMI faced no problems such as buffer filling up or timeout.

UDP

Although harder to code, UDP can communicate between two enterprise network computers, as firewalls (at least at Imperial) are not as restrictive with UDP ports. However, we still experienced significant issues with UDP: after ~230 messages on laptop (or ~303 between lab computers), the buffer for the UDP fills up and, although new messages come in, as it is a non-blocking communication the UDP messages keep on sending when the buffer is full.

One fix to this was to reduce the pacSize from 65508 (max size of UDP) to 50 (closer to the size of actual messages we were sending). This caused a dramatic increase in buffer size, allowing to send up to 5000 messages.

Effect of distance

We noticed that closer the computers better the communication was. On increasing the distance between the client and server, message losses also increased.

Timing delays- UDP loses packets due to congestion. This protocol works on the principal of fast communication and does not provide recovery for lost packets. On implementing a time delay of 5-10ms between transmission of each message, we noticed drastic results with no messages being lost in the communication. This is due to the fact that we decongested the network.

Reliability- UDP is not a reliable network to send messages. It can be used for fast communication where message losses are acceptable but not otherwise.

Possible Reasons of UDP message loss:

1. Errors on individual links
2. Network Congestion
3. Buffer filling up