**Project 2**

**Due Date: 10 Dec 11:59 pm**

**Instructions:**

**This assignment will enable you to apply what was learned in the first few classes and book readings.**

**You will be building a simplistic 3 tier message broker. The intent is for you to take some of the code that has been provided and to expand it to represent a more realistic network-based messaging system.**

**The application interfaces with the user and the Broadcast Relay (remember broadcast is limited to a local network (router) domain) and if the message is intended for a recipient off the local network then the Broadcast Relay will interact with the Multicast relay which will send the message to the Multicast Relay of the distant end which will in turn send the message onto the other Broadcast network of that local domain. (Remember that multicast is limited to groups which the communicants have joined and can only be ran on networks with multicast enabled and a route available between networks).**

**Example Scenarios:**

**Project2.png**

**See figure 1:**

**Application within Broadcast Domain A (or B) – wants to send a message just to local recipients. The Broadcast Relay associated with the application will simply place the message onto the local broadcast socket. The local Broadcast Relays will be able to read the message and pass it to their respective user application. The Multicast Relay for Domain A (or B) will see that the message is meant to stay local and do nothing with it.**

**Application within Broadcast Domain A – wants to send a message to Domain B (or vice versa). The Broadcast Relay associated with the application will again send the message via the broadcast socket. The Multicast Relay for Domain A will see that the message is for Domain B and place the message on the Multicast socket for domain B. Domain B Multicast Relay will see the message and place it on Domain B’s broadcast socket. All of the Broadcast Relays on Domain B will receive the message and pass it to their respective applications.**

**Application within Broadcast Domain B – wants to send a message to ALL domains. The local broadcast Relay associated with the application will place the message on the broadcast socket for all local recipients. The Multicast Relay see that the message is also intended for Domain A and send it across the multicast socket. The Domain A Multicast Relay will see that the message is also intended for Domain B and pass it onto the local broadcast socket.**

**NOTE: There should be just one Multicast Relay per domain. There can/should be multiple Broadcast Relays and associated Applications per broadcast domain.**

**Testing:**

**You should test with 2 Broadcast/Application combinations on each “domain” with a multicast relay per broadcast domain. All can be done on one host, but you will need to establish the sockets so that you have separation of domains. That said, talk to me if you do not have a multicast IP to utilize for a workaround. (Remember: ping 224.0.0.1 to see if you have a multicast address to use)**

**Main goals:**

**Incorporate user input, incorporate Multicast and Broadcast communication techniques, incorporate name and service resolution, incorporate daemon/background concepts, implement signal catching to make your background/daemon processes more resilient, and utilize messaging with Syslog for applications components in the background.**

**Define a “protocol” to communicate across UDP broad/multi-cast yet add reliance to the communication (i.e. sequence numbers) to ensure that all members can check the sequence to see if they have received all messages intended for them. Also, a means to determine if the message is not intended for them. I.e. [Sequence – Domain – Message]**