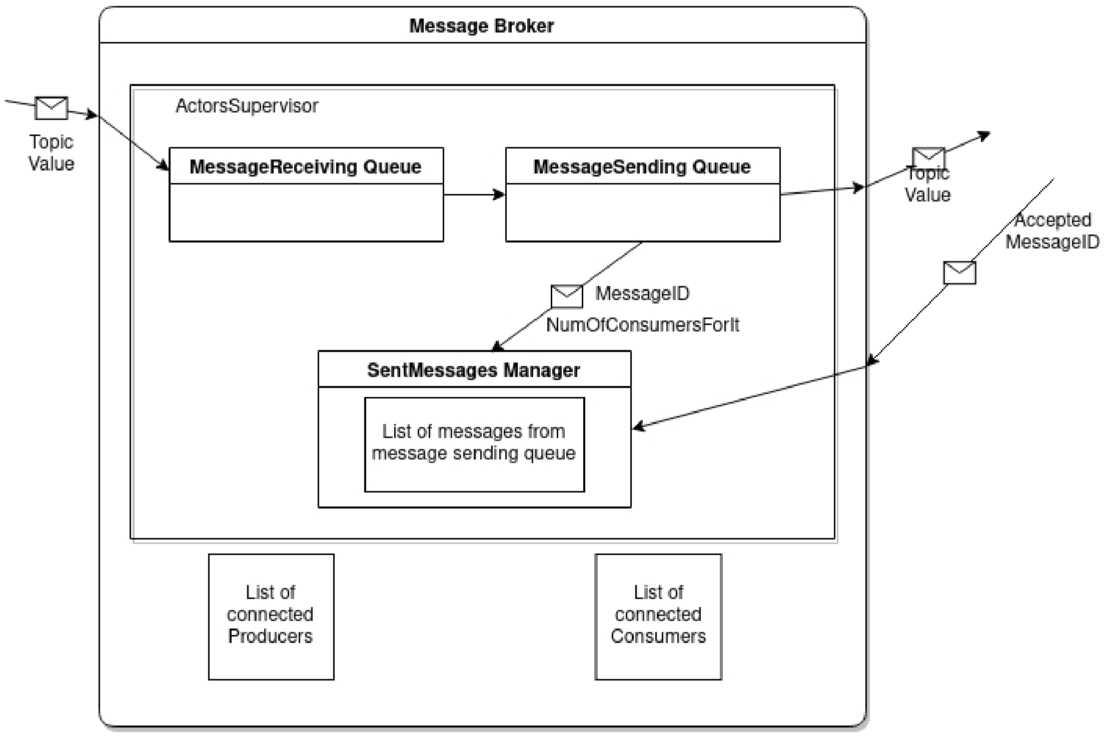

Figure 1.Message Broker Diagram

The **MessageBroker** runs in a separate dockerized application. It contains four actors and two lists (Figure 1). On the top of the actors hierarchy, the message broker has the **ActorsSupervisor** (Figure 2) - the uppermost parent of all the other actors. The rest of the hierarchy is composed of a **MessageReceiving Queue** that does exactly what its name says - receives messages from the outside. Upon receiving and processing them, it passes the message to the actor responsible for sending messages outside the broker - **MessageSending Queue**. Whenever a message is sent to a consumer, another message is sent to the **SentMessages Manager** actor, and it contains info about the message's ID and the number of consumers that have to receive it. Whenever a consumer confirms the receive (through a message stating the ID of the message it has accepted), the **SentMessages Manager** deletes the corresponding record from its list of messages that wait for confirmation. Each message sending actor creates its own message manager actor.

So, each **MessageSending Queue** actor creates and holds the address of a child actor - the **SentMessages Manager** actor that was created by it. The **MessageSending Queue** and the **MessageReceiving Queue** are on the same level in the actors hierarchy - as depicted in Figure 2 - they both pertain to the **ActorsSupervisor**. One supervisor means one of each child actors is created by it. The supervisor can kill child actors whenever a failure was propagated upwards to it. Same happens with the **MessageSending Queue** - it can kill its child actor - **SentMessages Manager** - in case of dysfunction. Moreover, the **MessageSending Queue** actor can kill itself in case it can't handle the child's failure, and the problem is passed on to the supervisor.

Aside from the actors, the message broker has two lists (Figure 1): one which accounts for the connected producers, and one for the consumers connected to the broker. If a message saying "quit" is sent to the broker, the specific "client" is disconnected from the corresponding broker's socket.

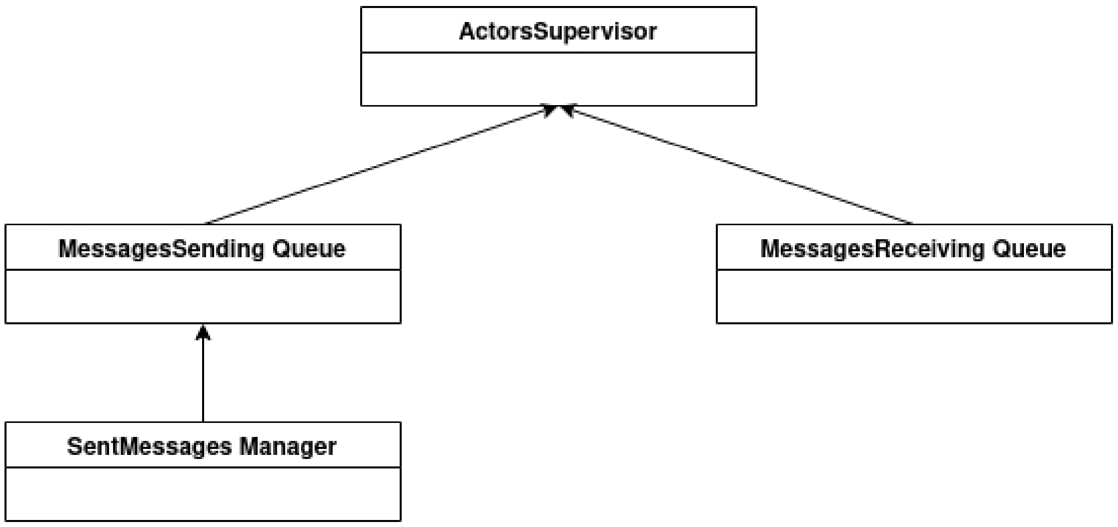

Figure 2.Actors Hierarchy Diagram