A Simple Peer To Peer Network Implementation

Hoora Abootalebi
Nariman Aryan
Amin Isaai
Amirhossein Khajepour
Mahdis Tajdari
Ali Zeynali

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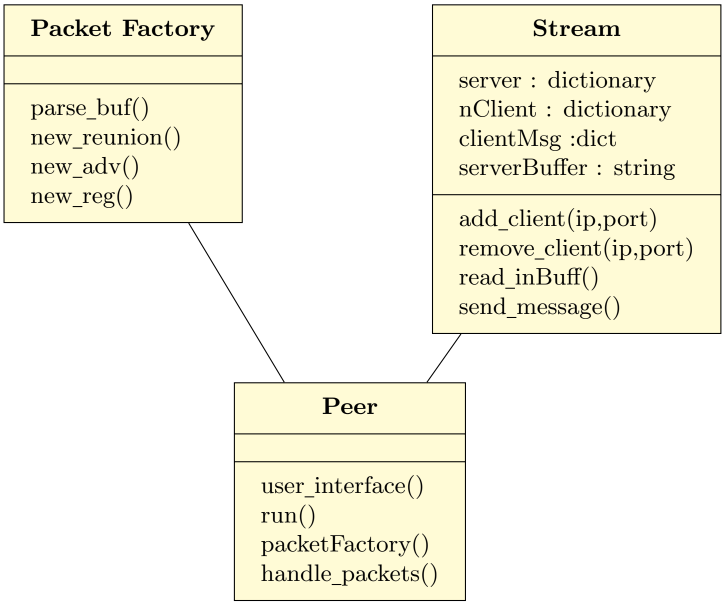
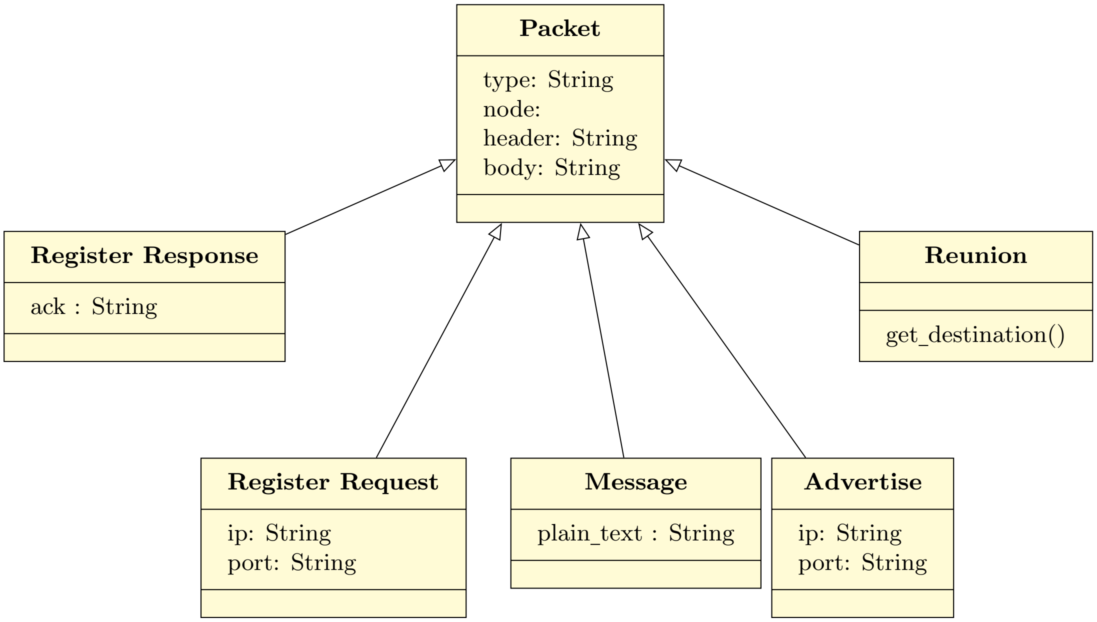
1 Introdeuction

This project aims to implement a peer to peer network. In the first step we design UML model and then we are going to explain each objects' attributes and methods.

2 UML model

We design the UML model in order to make the project more understandable, clearer and professional.





3 Objects

Now it's time to explain every obejct's duty.

3.1 Stream

This objects has one server and n clients. Servers are always open for reading and clients will be open whenever we want to write on a socket.
There is a clientMsg dictionary in this object to handle messages. This means that there is an array assigned to a specific client for all clients. If we need to add a new client to this object, we use add_client() method. Consequently, an array will be assigned to this new client in clientMsg.
There is also a remove_client() method for the times when we want to remove a client from this object. This method is mostly used when reunion fails.
The read_inBuf returns the buffer of the server.
The send_msg() method is used when peer wants to send a message to a specific client.
Byte_ack() is used to reply to the receives messages. We must reply all of the receives messages by sending Ack (which is a string).

```
#stream()
serverBuffer
add_client(ip,port)
remove_client(ip,port)
send_message()
read_inBuff()
```

We also need to add a dictionary to specify every client's message(s)

3.2 Peer

This object is the main object that we are working with. It must have a Stream object which provides the connection to the socket; This means that reading and writing are done using the Stream object. Peer must also have a userInterface object in order to facilitate commanding by users.(.e.g. for connecting or sending message to a specific node)
The run method handles all of the events included in stream in an infinite loop and it also handles the received messages; This means

that it does a certain action based on the type of the received packet.

```
#Peer()
stream()
user_interface() #Which the user or client sees and works with.
run()            #This method runs every time to see
               #whether there is new messages or not.
packetFactory()
handle_packets()
```

3.3 Packet Factory

packetFactory() The main functionality of this object is to create different types of packet and return them. To be more specific, we read data from buffer and we pass it through pars_buff() method in order to get a packet.

```
#packetFactory
parse_buf()
new_reunion()
new_adv() #makes a new advertise packet.
new_reg() #makes a new register packet.
```

3.4 Packet

Every packet consists seven differntes parts: **plain_text** which is the raw text message in the packet.
Node: Specifies to which node the packet sent to. **Sender** specifies who sent the packet **Validator** which makes the packet valid.
Header where the information such as type of the packet and etc. are going to be there.
Body body of our packet .

3.5 Reunion

reunion(packet) checks the connection of the nodes to the root.

```
#reunion(packet)
 get_destination()
```

3.6 Node

Every node has two parameters: **IP** and **Port**.

3.7 Resgister Request

reg_req() sends IP/Port of a node to the root to ask if it can register it.

3.8 Register Response

reg_res() should just send an from the root *Ack* to inform a node that it has been registerd in the root if the reg_req() was successful.

3.9 Advertise

adv(packet)

3.10 Mesasge

msg(packet)