# CLIENT SERVER COMMUNICATION PROTOCOL - SEQUENCE DIAGRAMS

We implemented the server so that it can hold one match at a time. Equal nicknames are not allowed in the same match. The server is persistent on disconnections, therefore a player which lose the connection during the match will be able to access the network again if he uses the same nicknames and the same device.
The client is also able to play offline single player matches, possibility which is not included in the sequence diagrams because it does not relate to the network communication.

In the sequence diagrams we assumed the client submits only well-formed inputs. In the real scenario when the client submits malformed inputs, the server will notify it to send another packet because the previous one was invalid.
Also if a client sends a packet when not requested to do so, the server will just ignore the packet.

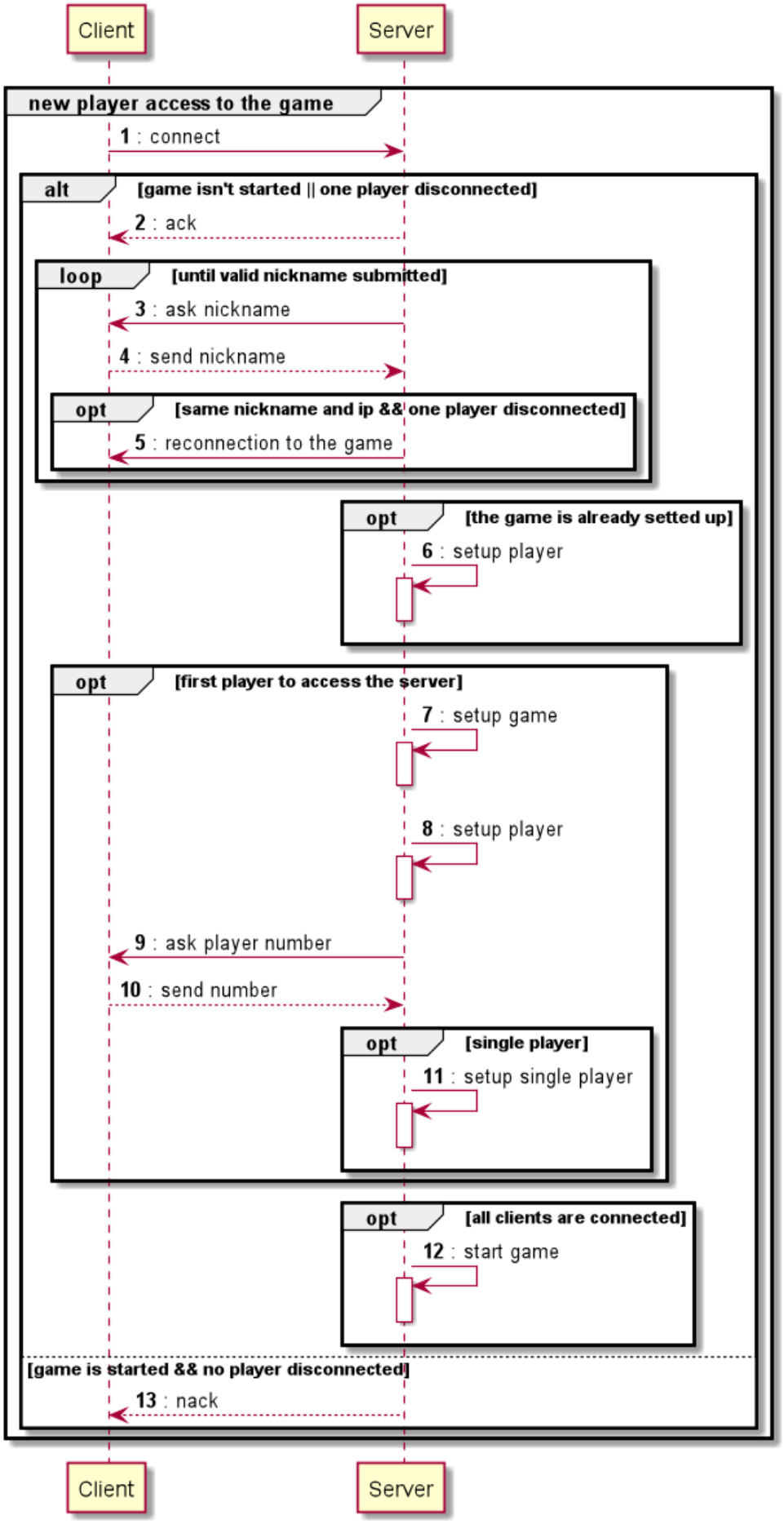
Lastly when the server requests the client to submit an input, a timer is started and if the client takes too long to answer it will be forced to disconnect by the server, still having the possibility to rejoin as stated previously.

The sequence diagrams show the network messages in the following game sequences:

1. A player's access to the game
2. The action "play a leader card"
3. The action "taking resources from the market"

The three sequence diagrams are followed by a brief explanation of the main details.

# 1. A player's access to the game

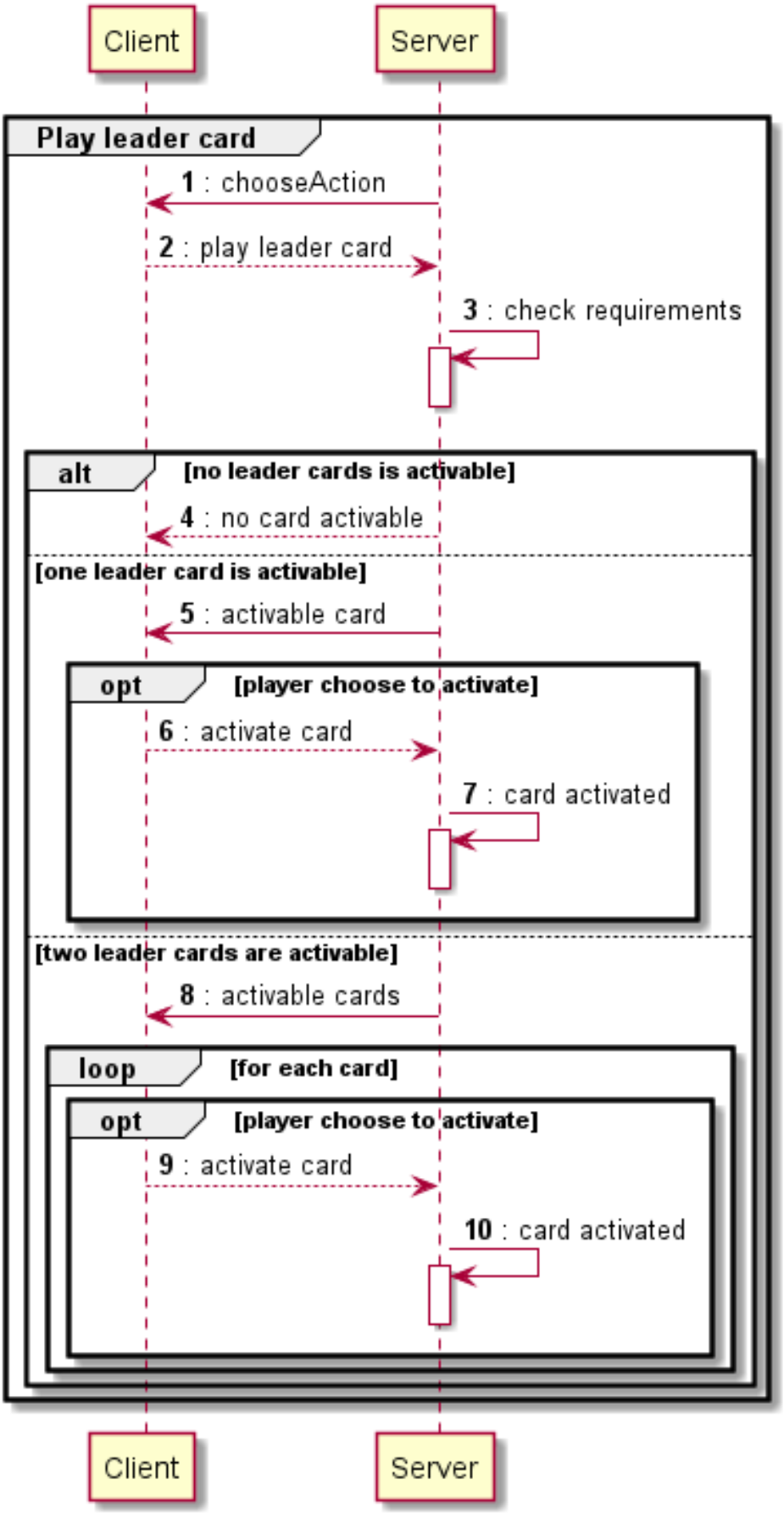


When a client tries to connect to the server, its request gets accepted only if the game is not started yet, or if at least one player lost his connection to the server during the current match. In the latter case the client IP address is compared to the disconnected player's one and if they match, the client is asked to insert the nickname used in the ongoing match to further prove his identity. If the provided nickname equals the previous one, the player can rejoin the game.

If the game is not started yet, the client is asked to choose a nickname which will have to differ from the nicknames provided by the other clients, otherwise the client will be asked to try another nickname until the inserted one is unique.

If the client is the first to join the match, the collective model structures are setup at this point together with the client's own structures. The client is also asked to choose the number of players, number which will define the game mode: single player if the number is one, multiplayer if the number range from two to four. In the former case the match will be immediately initiated, in the latter the server will wait for the number of connected clients to reach the provided number and only then the match will start.

## 2. The action “play a leader card”



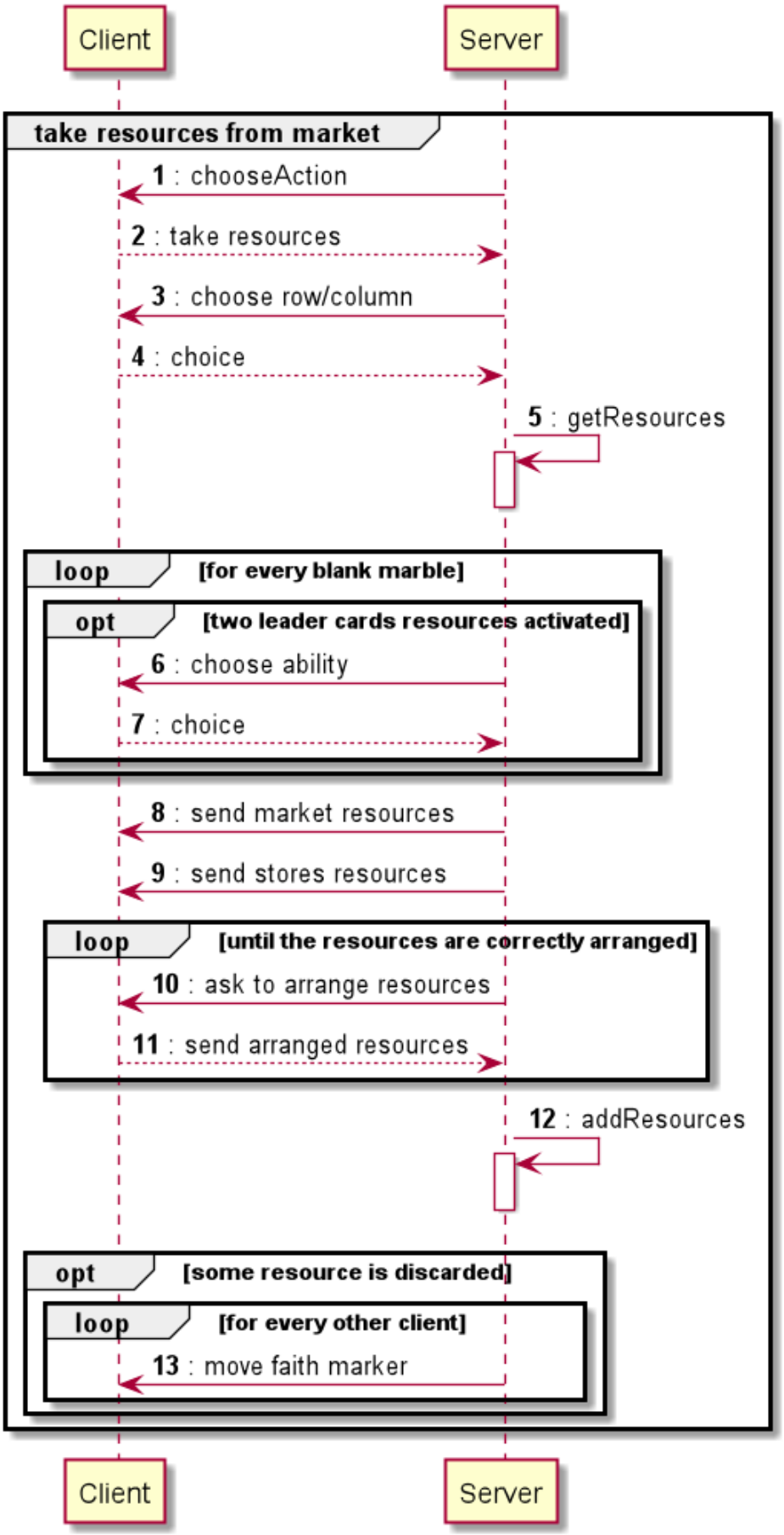
This action could be called before or after doing the three main actions.

After the player has chosen this action, his cards' requirements are checked to show him only the ones he can activate. Then, if the player does not have any card to activate, the server returns a message to communicate it to him.

If the player has one activable card, he could decide to activate it.

If the player has two activable cards, for each card, he can decide to activate it or not.

## 3. The action “taking resources from the market”



At the beginning of each round, the server asks the client to choose an action among the possible ones (e.g., play a leader card, activate production, buy a development card, ...). If the client chooses the action "taking resources from the market", the server will send the actual market structure of the match. Then the client will be asked to select a row or a column of marbles in the market. The client provides a valid input specifying whether row or column as well as which one (its number), then the server will get the selected line of marbles from the market by doing the necessary operations on the market tray. The server will now check if the player has an activated leader card with the ability to convert a white marble into a resource and, if so, it will convert each white marble taken from the market into the indicated resource. If the player has two leader cards activated with this ability, the client will be asked to choose which resource to take (from those given by the leader cards) for each of the white marbles. After that, the server will show to the client the resources taken from the market and the ones in the stores (warehouse shelves and, in case, each store added with a leader card ability).

The player has now the possibility to arrange the resources in the stores in the best possible way respecting their rules, in order to fit in the stores as many resources as they can.

The client sends the new arrangement of the stores to the server, which verify the correct management. If the check fails, the client will be asked to try to insert the resources again, otherwise the server will add the resources to the stores as indicated by the client.

At this point the server will control if there are any resources taken from the market discarded by the client by comparing the quantity of resources in the stores previously plus the number of valid resources taken from the market (i.e., excluding the white and the red marbles) and the quantity of resources in the stores after the addition. For each discarded resource, the server will move the faith marker of all the other players by one.