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┌─ 1 ──────────────────────────── MODULE CSComm ────────────────────────┐
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Specification of communication in a Client-Server system model.

5 EXTENDS $Naturals$, Op

7 CONSTANTS
8      $Client$,   the set of clients
9      $Server$ the (unique) server

11 VARIABLES
12      $cincoming$, $cincoming[c]$: incoming channel at the client $c \in Client$
13      $sincoming$ incoming channel at the $Server$

14 ├──┤

15 $vars \triangleq \langle cincoming, sincoming \rangle$

16 ├──┤

Messages between the $Server$ and the Clients. There are two kinds of messages according to their destinations. $TODO$: Abstraction from the concrete representation of messages.

22 $Msg \triangleq [c : Client, ack : Nat, op : Op] \cup$ messages sent to the $Server$ from a client $c \in Client$
23      $[ack : Nat, op : Op]$ messages broadcast to Clients from the $Server$

24 ├──┤

25 $TypeOK \triangleq \land cincoming \in [Client \rightarrow Seq(Msg)]$
26      $\land sincoming \in Seq(Msg)$

27 ├──┤

28 $Init \triangleq \land cincoming = [c \in Client \mapsto \langle \rangle]$
29      $\land sincoming = \langle \rangle$

A client sends a message msg to the $Server$.

33 $CSend(msg) \triangleq$
34      $\land sincoming' = Append(sincoming, msg)$
35      $\land$ UNCHANGED $cincoming$

The $Server$ broadcast a message msg to the Clients other than $c \in Client$.

41 $SBoradcast(c, msg) \triangleq$
42      $\land cincoming' = [cl \in Client \mapsto$
43   IF $cl = c$
44   THEN $cincoming[cl]$
45   ELSE $Append(cincoming[cl], msg)]$

46 ├──┤
47 └──┘

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