MODULE *GRPC*

LOCAL INSTANCE *Naturals*

LOCAL INSTANCE *Sequences*

LOCAL INSTANCE *FiniteSets*

LOCAL INSTANCE *TLC*

CONSTANT *Nil*

LOCAL $Min(s) \triangleq$ CHOOSE $x \in s : \forall\, y \in s : x \geq y$

LOCAL $Max(s) \triangleq$ CHOOSE $x \in s : \forall\, y \in s : x \leq y$

VARIABLE *servers*

VARIABLE *conns*

$vars \triangleq \langle servers,\ conns \rangle$

MODULE *Client*

$Connect(c,\ s) \triangleq$
  LET $maxId \triangleq Max(\text{DOMAIN } conns)$
      $connId \triangleq Min(\{i \in 1\ ..\ (maxId + 1) : i \notin \text{DOMAIN } conns\})$
  IN $conns' = conns \mathbin{@@} (connId :> [id \mapsto connId,\ src \mapsto c,\ dst \mapsto s,\ req \mapsto \langle\rangle,\ res \mapsto \langle\rangle])$

$Disconnect(c) \triangleq$
  $conns' = [x \in \text{DOMAIN } conns \setminus \{c.id\} \mapsto conns[x]]$

$Send(c,\ m) \triangleq$
  $conns' = [conns \text{ EXCEPT } ![c.id] = [conns[c.id] \text{ EXCEPT } !.req = Append(conns[c.id].req,\ m)]]$

$Receive(c) \triangleq$
  $conns' = [conns \text{ EXCEPT } ![c.id] = [conns[c.id] \text{ EXCEPT } !.res = SubSeq(conns[c.id].res,\ 2,\ Len(conns[c.i$

$Reply(c,\ m) \triangleq$
  $conns' = [conns' \text{ EXCEPT } ![c.id] = [conns'[c.id] \text{ EXCEPT } !.req = Append(conns'[c.id].req,\ m)]]$

$Handle(c,\ f(\_,\ \_)) \triangleq Len(c.res) > 0 \wedge f(c,\ c.res[1])$

$Client \triangleq$ INSTANCE *Client*

$Connections \triangleq \{conns[c] : c \in \text{DOMAIN } conns\}$

MODULE *Server*

$Start(s) \triangleq$
$\quad \land servers' = servers \cup \{s\}$
$\quad \land$ UNCHANGED $\langle conns \rangle$

$Stop(s) \triangleq$
$\quad \land servers' = servers \setminus \{s\}$
$\quad \land conns' = [c \in$ DOMAIN $conns \setminus \{c \in conns : conns[c].dst \neq s\} \mapsto conns[c]]$

$Send(c, m) \triangleq$
$\quad conns' = [conns$ EXCEPT $![c.id] = [conns[c.id]$ EXCEPT $!.res = Append(conns[c.id].res, m)]]$

$Receive(c) \triangleq$
$\quad conns' = [conns$ EXCEPT $![c.id] = [conns[c.id]$ EXCEPT $!.req = SubSeq(conns[c.id].req, 2, Len(conns[c.i$

$Reply(c, m) \triangleq$
$\quad conns' = [conns'$ EXCEPT $![c.id] = [conns'[c.id]$ EXCEPT $!.res = Append(conns'[c.id].res, m)]]$

$Handle(c, f(\_, \_)) \triangleq Len(c.req) > 0 \land f(c, c.req[1])$

$Servers \triangleq servers$

$Server \triangleq$ INSTANCE $Server$

$Init \triangleq$
$\quad \land servers = \{\}$
$\quad \land conns = [c \in \{\} \mapsto [e2n \mapsto Nil, e2t \mapsto Nil, req \mapsto \langle\rangle, res \mapsto \langle\rangle]]$

$Next \triangleq$
$\quad \lor$ TRUE

* Modification History
* Last modified *Fri Aug* 13 16:27:39 *PDT* 2021 by *jordanhalterman*
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