

```

┌────────────────────────── MODULE SCTP ───────────────────────────┐
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 conns
vars  $\triangleq$   $\langle \textit{conns} \rangle$ 
┌────────────────────────── MODULE Client ───────────────────────────┐
  Connect(src, dst)  $\triangleq$ 
    LET  $\textit{maxId} \triangleq \textit{Max}(\text{DOMAIN } \textit{conns})$ 
       $\textit{connId} \triangleq \textit{Min}(\{i \in 1 \dots (\textit{maxId} + 1) : i \notin \text{DOMAIN } \textit{conns}\})$ 
    IN  $\textit{conns}' = \textit{conns} @@ (\textit{connId} :> [id \mapsto \textit{connId}, \textit{src} \mapsto \textit{src}, \textit{dst} \mapsto \textit{dst}, \textit{req} \mapsto \langle \rangle, \textit{res} \mapsto \langle \rangle])$ 

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

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

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

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

  Handle(c, f(-, -))  $\triangleq \textit{Len}(c.\textit{res}) > 0 \wedge f(c, c.\textit{res}[1])$ 
┌────────────────────────────────────────────────────────────────────────┐
Client  $\triangleq$  INSTANCE Client
Connections  $\triangleq \{ \textit{conns}[c] : c \in \text{DOMAIN } \textit{conns} \}$ 
┌────────────────────────── MODULE Server ───────────────────────────┐

```

$$\begin{aligned}
Send(c, m) &\triangleq \\
&\quad conns' = [conns \text{ EXCEPT } ![c.id] = [conns[c.id] \text{ EXCEPT } !.res = Append(conns[c.id].res, m)]] \\
Receive(c) &\triangleq \\
&\quad conns' = [conns \text{ EXCEPT } ![c.id] = [conns[c.id] \text{ EXCEPT } !.req = SubSeq(conns[c.id].req, 2, Len(conns[c.id].req))] \\
Reply(c, m) &\triangleq \\
&\quad conns' = [conns' \text{ EXCEPT } ![c.id] = [conns'[c.id] \text{ EXCEPT } !.res = Append(conns'[c.id].res, m)]] \\
Handle(c, f(-, -)) &\triangleq Len(c.req) > 0 \wedge f(c, c.req[1])
\end{aligned}$$

$Server \triangleq \text{INSTANCE } Server$

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

$Next \triangleq$
 $\vee \text{UNCHANGED } \langle conns \rangle$

\backslash * Modification History
 \backslash * Last modified *Mon Sep 13 15:19:55 PDT 2021* by *jordanhalterman*
 \backslash * Created *Mon Sep 13 12:21:16 PDT 2021* by *jordanhalterman*