
MODULE *P2PChannel*

Specify a channel between two nodes in a *p2p* network.

Messages can be sent multiple times on a channel.

Messages can be lost in a channel.

EXTENDS *Naturals, Sequence*

CONSTANT *Data*

VARIABLE *chan*

TypeInvariant \triangleq
 $\wedge \text{chan} \in [\text{msgs} : \text{Seq}(\text{Data})]$

Init \triangleq $\wedge \text{TypeInvariant}$
 $\wedge \text{chan.msgs} = \langle \rangle$

Send(*d*) \triangleq $\wedge \text{Append}(\text{chan.msgs}, d)$

Recv \triangleq $\wedge \text{chan}' = [\text{chan} \text{ EXCEPT } !.\text{msgs} = \text{Tail}(@)]$

Lose \triangleq $\wedge \text{chan}' = [\text{chan} \text{ EXCEPT } !.\text{msgs} = \text{Tail}(@)]$

Next \triangleq $\vee (\exists d \in \text{Data} : \text{Send}(d))$
 $\vee \text{Recv}$
 $\vee \text{Lose}$

Spec \triangleq $\text{Init} \wedge \square[\text{Next}]_{\text{chan}}$

THEOREM $\text{Spec} \Rightarrow \square \text{TypeInvariant}$

\ * Modification History
\ * Last modified *Wed Mar 29 12:48:31 CEST 2023* by *kulpreet*
\ * Created *Wed Mar 29 12:19:34 CEST 2023* by *kulpreet*