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MODULE *Network*

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The *Network* module models the behavior intra-cluster communication channels over *gRPC*.

EXTENDS *Naturals*, *FiniteSets*, *Sequences*, *TLC*

An empty value

CONSTANT *Nil*

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The domain of all active channels

VARIABLE *channels*

The current channel *ID*

VARIABLE *channelId*

$vars \triangleq \langle channels, channelId \rangle$

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Opens a channel from the given source to the given destination

$OpenChannel(src, dest) \triangleq$   
 $\wedge channelId' = channelId + 1$   
 $\wedge channels' = [channels \text{ EXCEPT } ![channelId']] = [src \mapsto src, dest \mapsto dest, msgs \mapsto \langle \rangle]$

Closes a channel by *ID*

$CloseChannel(c) \triangleq$   
 $\wedge channels' = [i \in \text{DOMAIN } channels \cap \{c\} \mapsto channels[i]]$

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$Init \triangleq$   
 $\wedge channelId = 0$   
 $\wedge channels = [c \in \{\}] \mapsto [source \mapsto Nil, dest \mapsto Nil, msgs \mapsto \langle \rangle]$

$Next \triangleq$   
 $\vee \exists c \in \text{DOMAIN } channels : CloseChannel(c)$

$Spec \triangleq Init \wedge \Box [Next]_{vars}$

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