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MODULE *Mastership*

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INSTANCE *Naturals*  
 INSTANCE *FiniteSets*  
 INSTANCE *Sequences*  
 INSTANCE *TLC*

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An empty constant  
 CONSTANT *Nil*

The set of possible master nodes  
 CONSTANT *Node*

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Variables defined by other modules.  
 VARIABLES  
     *conns*

A record of target masterships  
 VARIABLE *mastership*

$TypeOK \triangleq$   
      $\wedge mastership.term \in Nat$   
      $\wedge mastership.master \neq Nil \Rightarrow mastership.master \in Node$   
      $\wedge mastership.conn \in Nat$

LOCAL *State*  $\triangleq$  [  
     *mastership*  $\mapsto mastership$ ,  
     *conns*  $\mapsto conns$ ]

LOCAL *Transitions*  $\triangleq$   
     IF *mastership'*  $\neq mastership$  THEN [*mastership*  $\mapsto mastership'$ ] ELSE  $\langle \rangle$

$Test \triangleq$  INSTANCE *Test* WITH  
     *File*  $\leftarrow$  "Mastership.log"

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This section models *mastership* for the configuration service.

*Mastership* is used primarily to track the lifecycle of individual configuration targets and react to state changes on the southbound. Each target is assigned a master from the *Node* set, and masters can be unset when the target disconnects.

$ReconcileMastership(n) \triangleq$   
      $\wedge \vee \wedge conns[n].connected$

$$\begin{aligned}
& \wedge \text{mastership.master} = \text{Nil} \\
& \wedge \text{mastership}' = [ \\
& \quad \text{master} \mapsto n, \\
& \quad \text{term} \mapsto \text{mastership.term} + 1, \\
& \quad \text{conn} \mapsto \text{conns}[n].\text{id}] \\
& \vee \wedge \vee \neg \text{conns}[n].\text{connected} \\
& \quad \vee \text{conns}[n].\text{id} \neq \text{mastership.conn} \\
& \wedge \text{mastership.master} = n \\
& \wedge \text{mastership}' = [\text{mastership} \text{ EXCEPT } !.\text{master} = \text{Nil}] \\
& \wedge \text{UNCHANGED } \langle \text{conns} \rangle
\end{aligned}$$


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