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MODULE *Mastership*

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EXTENDS *Southbound*

INSTANCE *Naturals*

INSTANCE *FiniteSets*

LOCAL INSTANCE *TLC*

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CONSTANT *TraceMastership*

A record of target *masterships*

VARIABLE *mastership*

LOCAL *InitState*  $\triangleq$   
     [*nodes*  $\mapsto$  *node*,  
       *masterships*  $\mapsto$  *mastership*]

LOCAL *NextState*  $\triangleq$   
     [*nodes*  $\mapsto$  *node'*,  
       *masterships*  $\mapsto$  *mastership'*]

LOCAL *Trace*  $\triangleq$  INSTANCE *Trace* WITH  
     *Module*  $\leftarrow$  "Mastership",  
     *InitState*  $\leftarrow$  *InitState*,  
     *NextState*  $\leftarrow$  *NextState*,  
     *Enabled*  $\leftarrow$  *TraceMastership*

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This section models *mastership* reconciliation.

*ReconcileMastership*(*n*)  $\triangleq$   
      $\wedge \vee \wedge$  *node*[*n*].*connected*  
          $\wedge$  *mastership*.*master* = *Nil*  
          $\wedge$  *mastership'* = [*master*  $\mapsto$  *n*, *term*  $\mapsto$  *mastership.term* + 1]  
      $\vee \wedge \neg$  *node*[*n*].*connected*  
          $\wedge$  *mastership*.*master* = *n*  
          $\wedge$  *mastership'* = [*mastership* EXCEPT !.*master* = *Nil*]  
      $\wedge$  UNCHANGED  $\langle$ *node*, *target* $\rangle$

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Formal specification, constraints, and theorems.

*InitMastership*  $\triangleq$   
      $\wedge$  *mastership* = [*master*  $\mapsto$  *Nil*, *term*  $\mapsto$  0]

$$NextMastership \triangleq$$

$$\forall \exists n \in Node :$$

$$Trace! Step(ReconcileMastership(n), [node \mapsto n])$$


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\ \* Modification History  
\ \* Last modified Sun Feb 20 09:09:52 PST 2022 by jordanhalterman  
\ \* Created Sun Feb 20 03:13:26 PST 2022 by jordanhalterman