
MODULE *Mastership*

EXTENDS *Southbound*

INSTANCE *Naturals*

INSTANCE *FiniteSets*

LOCAL INSTANCE *TLC*

The set of all nodes
 CONSTANT *Node*

A record of target *masterships*
 VARIABLE *mastership*

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

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

LOCAL *Trace* \triangleq INSTANCE *Trace* WITH
 $Module \leftarrow \text{"Mastership"},$
 $InitState \leftarrow InitState,$
 $NextState \leftarrow NextState$

This section models *mastership* reconciliation.

ReconcileMastership(*n*) \triangleq
 $\wedge \vee \wedge conn.state = Connected$
 $\wedge mastership.master \neq n$
 $\wedge mastership' = [master \mapsto n, term \mapsto mastership.term + 1]$
 $\vee \wedge conn.state = Disconnected$
 $\wedge mastership.master \neq Nil$
 $\wedge mastership' = [mastership \text{ EXCEPT } !.master = Nil]$
 $\wedge \text{UNCHANGED } \langle conn, target \rangle$

Formal specification, constraints, and theorems.

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

$$NextMastership \triangleq$$

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

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

ASSUME $\wedge IsFiniteSet(Node)$
 $\wedge \forall n \in Node :$
 $\wedge n \in STRING$

\ * Modification History
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