MODULE *Mastership*

INSTANCE *Naturals*

INSTANCE *FiniteSets*

INSTANCE *Sequences*

INSTANCE *TLC*

An empty constant
CONSTANT *Nil*

The set of possible master nodes
CONSTANT *Node*

Variables defined by other modules.
VARIABLES
conn

A record of target masterships
VARIABLE *mastership*

$$
\begin{aligned}
&\mathit{TypeOK} \triangleq \\
&\quad \land\ \mathit{mastership.term} \in \mathit{Nat} \\
&\quad \land\ \mathit{mastership.master} \neq \mathit{Nil} \Rightarrow \mathit{mastership.master} \in \mathit{Node} \\
&\quad \land\ \mathit{mastership.conn} \in \mathit{Nat}
\end{aligned}
$$

$$
\begin{aligned}
&\text{LOCAL } \mathit{CurrState} \triangleq [\\
&\quad \mathit{mastership} \mapsto \mathit{mastership}, \\
&\quad \mathit{conn} \quad\ \mapsto \mathit{conn}]
\end{aligned}
$$

$$
\begin{aligned}
&\text{LOCAL } \mathit{SuccState} \triangleq \\
&\quad \langle\rangle \mathbin{@@} \\
&\quad (\text{IF } \mathit{mastership}' \neq \mathit{mastership} \text{ THEN } [\mathit{mastership} \mapsto \mathit{mastership}'] \text{ ELSE } \langle\rangle) \mathbin{@@} \\
&\quad (\text{IF } \mathit{conn}' \neq \mathit{conn} \text{ THEN } [\mathit{conn} \mapsto \mathit{conn}'] \text{ ELSE } \langle\rangle)
\end{aligned}
$$

$$
\begin{aligned}
&\mathit{Test} \triangleq \text{INSTANCE } \mathit{Test} \text{ WITH} \\
&\quad \mathit{File} \leftarrow \text{“Mastership.log”}
\end{aligned}
$$

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.

$$
\begin{array}{l}
ReconcileMastership(n) \triangleq \\
\quad \land \lor \land conn[n].connected \\
\qquad \land mastership.master = Nil \\
\qquad \land mastership' = [\\
\qquad\quad master \mapsto n, \\
\qquad\quad term \quad \mapsto mastership.term + 1, \\
\qquad\quad conn \quad \mapsto conn[n].id] \\
\qquad \lor \land \lor \neg conn[n].connected \\
\qquad\quad \lor conn[n].id \neq mastership.conn \\
\qquad \land mastership.master = n \\
\qquad \land mastership' = [mastership \text{ EXCEPT } !.master = Nil] \\
\quad \land \text{UNCHANGED } \langle conn \rangle
\end{array}
$$