$\qquad\qquad\qquad$ MODULE *Configuration* $\qquad\qquad\qquad$

EXTENDS *Mastership*

INSTANCE *Naturals*

INSTANCE *FiniteSets*

LOCAL INSTANCE *TLC*

―――――――――――――――――――――――――――――――――――――――

  Status constants
CONSTANTS
    *ConfigurationInProgress*,
    *ConfigurationComplete*,
    *ConfigurationFailed*

CONSTANT *TraceConfiguration*

  A record of per-target configurations
VARIABLE *configuration*

―――――――――――――――――――――――――――――――――――――――

LOCAL *InitState* $\triangleq$
    $[configurations \mapsto configuration,$
    $\ targets \qquad\quad \mapsto target,$
    $\ masterships \quad \mapsto mastership,$
    $\ node \qquad\quad\ \mapsto node]$

LOCAL *NextState* $\triangleq$
    $[configurations \mapsto configuration',$
    $\ targets \qquad\quad \mapsto target',$
    $\ masterships \quad \mapsto mastership',$
    $\ node \qquad\quad\ \mapsto node']$

LOCAL *Trace* $\triangleq$ INSTANCE *Trace* WITH
    *Module* $\quad \leftarrow$ "Configurations",
    *InitState* $\ \leftarrow InitState,$
    *NextState* $\leftarrow NextState,$
    *Enabled* $\quad \leftarrow TraceConfiguration$

―――――――――――――――――――――――――――――――――――――――

This section models the *Configuration* reconciler.
$ReconcileConfiguration(n) \triangleq$
    $\land\ mastership.master = n$
    $\land\ \lor\ \land\ configuration.state \neq ConfigurationInProgress$

1

$\land\ configuration.applied.term < mastership.term$
$\land\ configuration' = [configuration\ \text{EXCEPT}\ !.state = ConfigurationInProgress]$
$\land\ \text{UNCHANGED}\ \langle target \rangle$
$\lor\ \land\ configuration.state = ConfigurationInProgress$
$\land\ configuration.applied.term < mastership.term$
$\land\ node[n].connected$
$\land\ target.running$
$\land\ target' = [target\ \text{EXCEPT}\ !.values = configuration.applied.values]$
$\land\ configuration' = [configuration\ \text{EXCEPT}\ !.applied.term = mastership.term,$
$!.state\qquad = ConfigurationComplete]$
$\land\ \text{UNCHANGED}\ \langle mastership,\ node \rangle$

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Formal specification, constraints, and theorems.

$InitConfiguration\ \triangleq$
$\quad \land\ configuration = [$
$\qquad state \qquad \mapsto ConfigurationInProgress,$
$\qquad index \qquad \mapsto 0,$
$\qquad committed \mapsto [$
$\qquad\quad index \quad \mapsto 0,$
$\qquad\quad term \quad \mapsto 0,$
$\qquad\quad values \quad \mapsto [$
$\qquad\qquad path \in \{\} \mapsto [$
$\qquad\qquad\quad path \qquad \mapsto path,$
$\qquad\qquad\quad value \quad \mapsto Nil,$
$\qquad\qquad\quad index \quad \mapsto 0,$
$\qquad\qquad\quad deleted \mapsto \text{FALSE}]]],$
$\qquad proposed \quad \mapsto [index \mapsto 0],$
$\qquad applied \quad \mapsto [$
$\qquad\quad index \quad \mapsto 0,$
$\qquad\quad term \quad \mapsto 0,$
$\qquad\quad values \mapsto [$
$\qquad\qquad path \in \{\} \mapsto [$
$\qquad\qquad\quad path \qquad \mapsto path,$
$\qquad\qquad\quad value \quad \mapsto Nil,$
$\qquad\qquad\quad index \quad \mapsto 0,$
$\qquad\qquad\quad deleted \mapsto \text{FALSE}]]]]$
$\quad \land\ Trace!Init$

$NextConfiguration\ \triangleq$
$\quad \lor\ \exists\, n \in Node:$
$\qquad Trace!Step(ReconcileConfiguration(n),\ [node \mapsto n])$

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\ * Modification History

2

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