MODULE *Configurations*

EXTENDS *Southbound*

INSTANCE *Naturals*

INSTANCE *FiniteSets*

LOCAL INSTANCE *TLC*

Status constants

CONSTANTS
ConfigurationInProgress,
ConfigurationComplete,
ConfigurationFailed

A record of per-target configurations

VARIABLE *configuration*

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

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

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

This section models the *Configuration* reconciler.

ReconcileConfiguration$(n,\ t)$ $\triangleq$
$\land \lor \land Target[t].persistent$
$\land configuration[t].state \neq ConfigurationComplete$
$\land configuration' = [configuration$ EXCEPT $![t].state = ConfigurationComplete]$
$\land$ UNCHANGED $\langle target \rangle$
$\lor \land \neg Target[t].persistent$
$\land \lor mastership[t].term > configuration[t].config.term$
$\lor \land mastership[t].term = configuration[t].config.term$

$\land\ mastership[t].master = Nil$
$\land\ configuration' = [configuration\ \text{EXCEPT}\ ![t].config.term = mastership[t].term,$
$\qquad ![t].state = ConfigurationInProgress]$
$\land\ \text{UNCHANGED}\ \langle target \rangle$
$\lor\ \land\ configuration[t].state = ConfigurationInProgress$
$\land\ mastership[t].term = configuration[t].config.term$
$\land\ mastership[t].master = n$
$\land\ target' = [target\ \text{EXCEPT}\ ![t] = configuration[t].target.values]$
$\land\ configuration' = [configuration\ \text{EXCEPT}\ ![t].target.term = mastership[t].term,$
$\qquad ![t].state = ConfigurationComplete]$
$\land\ \text{UNCHANGED}\ \langle mastership \rangle$

Formal specification, constraints, and theorems.

$InitConfiguration \triangleq$
$\land\ configuration = [t \in \text{DOMAIN}\ Target \mapsto$
$[state \mapsto ConfigurationInProgress,$
$config \mapsto$
$[index \mapsto 0,$
$term \mapsto 0,$
$values \mapsto$
$[path \in \{\} \mapsto$
$[path \mapsto path,$
$value \mapsto Nil,$
$index \mapsto 0,$
$deleted \mapsto \text{FALSE}]]],$
$proposal \mapsto [index \mapsto 0],$
$commit \mapsto [index \mapsto 0],$
$target \mapsto$
$[index \mapsto 0,$
$term \mapsto 0,$
$values \mapsto$
$[path \in \{\} \mapsto$
$[path \mapsto path,$
$value \mapsto Nil,$
$index \mapsto 0,$
$deleted \mapsto \text{FALSE}]]]]]$
$\land\ Trace!Init$

$NextConfiguration \triangleq$
$\lor\ \exists\, n \in Node :$
$\exists\, t \in \text{DOMAIN}\ configuration :$
$Trace!Step(\text{“Reconcile”},\ ReconcileConfiguration(n,\ t),\ [node \mapsto n,\ target \mapsto t])$

\ * Modification History
\ * Last modified Sun *Feb* 20 10:07:49 *PST* 2022 by *jordanhalterman*
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