

---

MODULE *Configuration*

---

INSTANCE *Naturals*

INSTANCE *FiniteSets*

INSTANCE *Sequences*

INSTANCE *TLC*

---

An empty constant  
CONSTANT *Nil*

Status constants  
CONSTANTS  
    *Pending*,  
    *InProgress*,  
    *Complete*

*Status*  $\triangleq$   
    {*Pending*,  
      *InProgress*,  
      *Complete*}

---

Variables defined by other modules.  
VARIABLES  
    *mastership*,  
    *target*

A record of per-target configurations  
VARIABLE *configuration*

*TypeOK*  $\triangleq$   
     $\wedge \text{configuration.state} \in \text{Status}$   
     $\wedge \text{configuration.term} \in \text{Nat}$   
     $\wedge \text{configuration.committed.index} \in \text{Nat}$   
     $\wedge \text{configuration.committed.revision} \in \text{Nat}$   
     $\wedge \forall p \in \text{DOMAIN configuration.committed.values} :$   
         $\wedge \text{configuration.committed.values}[p].\text{index} \in \text{Nat}$   
         $\wedge \text{configuration.committed.values}[p].\text{value} \neq \text{Nil} \Rightarrow$   
             $\text{configuration.committed.values}[p].\text{value} \in \text{STRING}$   
     $\wedge \text{configuration.applied.index} \in \text{Nat}$   
     $\wedge \text{configuration.applied.revision} \in \text{Nat}$   
     $\wedge \forall p \in \text{DOMAIN configuration.applied.values} :$   
         $\wedge \text{configuration.applied.values}[p].\text{index} \in \text{Nat}$

$$\wedge \text{configuration.applied.values}[p].\text{value} \neq \text{Nil} \Rightarrow \\ \text{configuration.applied.values}[p].\text{value} \in \text{STRING}$$

$\text{Test} \triangleq \text{INSTANCE } \text{Test} \text{ WITH}$   
 $\text{File} \quad \leftarrow \text{"Configuration.log"},$   
 $\text{CurrState} \leftarrow [$   
 $\quad \text{configuration} \mapsto \text{configuration},$   
 $\quad \text{mastership} \quad \mapsto \text{mastership},$   
 $\quad \text{target} \quad \quad \mapsto \text{target}],$   
 $\text{SuccState} \leftarrow [$   
 $\quad \text{configuration} \mapsto \text{configuration'},$   
 $\quad \text{mastership} \quad \mapsto \text{mastership'},$   
 $\quad \text{target} \quad \quad \mapsto \text{target'}]$

---

This section models the *Configuration* reconciler.

$\text{ReconcileConfiguration}(n) \triangleq$   
 $\wedge \vee \wedge \text{configuration.state} = \text{Pending}$   
 $\quad \wedge \text{configuration.term} = \text{mastership.term}$   
 $\quad \wedge \text{mastership.master} = n$   
 $\quad \wedge \text{configuration}' = [\text{configuration} \text{ EXCEPT } !.\text{state} = \text{InProgress}]$   
 $\vee \wedge \text{configuration.state} = \text{InProgress}$   
 $\quad \wedge \text{configuration.term} = \text{mastership.term}$   
 $\quad \wedge \text{mastership.master} = n$   
 $\quad \wedge \text{target}' = [\text{target} \text{ EXCEPT } !.\text{values} = \text{configuration.applied.values}]$   
 $\quad \wedge \text{configuration}' = [\text{configuration} \text{ EXCEPT } !.\text{state} = \text{Complete}]$   
 $\vee \wedge \text{configuration.term} < \text{mastership.term}$   
 $\quad \wedge \text{configuration}' = [\text{configuration} \text{ EXCEPT } !.\text{state} = \text{Pending},$   
 $\quad \quad \quad !.\text{term} = \text{mastership.term}]$   
 $\wedge \text{UNCHANGED } \langle \text{mastership} \rangle$

---