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MODULE *Configuration*

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INSTANCE *Naturals*

INSTANCE *FiniteSets*

INSTANCE *Sequences*

INSTANCE *TLC*

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An empty constant  
CONSTANT *Nil*

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

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

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

A record of per-target configurations  
VARIABLE *configuration*

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

$$\begin{aligned}
& \wedge \forall p \in \text{DOMAIN } \text{configuration.applied.values} : \\
& \quad \wedge \text{configuration.applied.values}[p].\text{index} \in \text{Nat} \\
& \quad \wedge \text{configuration.applied.values}[p].\text{value} \neq \text{Nil} \Rightarrow \\
& \quad \quad \text{configuration.applied.values}[p].\text{value} \in \text{STRING}
\end{aligned}$$

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

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This section models the *Configuration* reconciler.

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


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