
MODULE *Southbound*

INSTANCE *Naturals*

INSTANCE *FiniteSets*

LOCAL INSTANCE *TLC*

An empty constant

CONSTANT *Nil*

Target is the set of all targets and their possible paths and values.

Example: $Target \triangleq$ [
 $values \mapsto$ [
 $path1 \mapsto \{“value1”, “value2”\},$
 $path2 \mapsto \{“value3”\}$]

CONSTANT *Target*

A record of target states

VARIABLE *target*

The set of all nodes

CONSTANT *Node*

The state of nodes

VARIABLE *node*

This section models node and target states.

$Start \triangleq$

$\wedge \neg target.running$
 $\wedge target' = [target \text{ EXCEPT } !.incarnation = target.incarnation + 1,$
 $\hspace{15em} !.running = TRUE]$
 $\wedge \text{UNCHANGED } \langle node \rangle$

$Stop \triangleq$

$\wedge target.running$
 $\wedge target' = [target \text{ EXCEPT } !.running = FALSE,$
 $\hspace{15em} !.values = [p \in \{\} \mapsto [value \mapsto Nil]]]$
 $\wedge \text{UNCHANGED } \langle node \rangle$

$Connect(n) \triangleq$

$\wedge \neg node[n].connected$
 $\wedge target.running$
 $\wedge node' = [node \text{ EXCEPT } ![n].incarnation = node[n].incarnation + 1,$
 $\hspace{15em} ![n].connected = TRUE]$

$\wedge \text{UNCHANGED } \langle target \rangle$

$Disconnect(n) \triangleq$
 $\wedge node[n].connected$
 $\wedge node' = [node \text{ EXCEPT } ![n].connected = \text{FALSE}]$
 $\wedge \text{UNCHANGED } \langle target \rangle$

$InitSouthbound \triangleq$
 $\wedge target = [incarnation \mapsto 0,$
 $\quad \quad \quad running \mapsto \text{FALSE},$
 $\quad \quad \quad values \mapsto [p \in \{ \} \mapsto [value \mapsto Nil]]]$
 $\wedge node = [n \in Node \mapsto [incarnation \mapsto 0, connected \mapsto \text{FALSE}]]$

$NextSouthbound \triangleq$
 $\vee Start$
 $\vee Stop$
 $\vee \exists n \in Node : Connect(n)$
 $\vee \exists n \in Node : Disconnect(n)$

ASSUME $\wedge \forall p \in \text{DOMAIN } Target.values :$
 $\quad \quad \quad IsFiniteSet(Target.values[p])$

ASSUME $\wedge IsFiniteSet(Node)$
 $\wedge \forall n \in Node :$
 $\quad \quad \quad \wedge n \in \text{STRING}$

\ * Modification History
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