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- MODULE Southbound -
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INSTANCE Naturals
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INSTANCE FiniteSets

LOCAL INSTANCE TLC

An empty constant

CONSTANT Nil

The set of all nodes

CONSTANT Node

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

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 \begin{aligned} & \operatorname{Example:} \\ & \operatorname{Target} \ \triangleq \\ & [\operatorname{target1} \mapsto \\ & [\operatorname{persistent} \mapsto \operatorname{FALSE}, \operatorname{values} \mapsto [\\ & \operatorname{path1} \mapsto \{ \text{``value1''}, \text{``value2''} \}, \\ & \operatorname{path2} \mapsto \{ \text{``value2''}, \text{``value3''} \}]], \\ & \operatorname{target2} \mapsto \\ & [\operatorname{persistent} \mapsto \operatorname{TRUE}, \operatorname{values} \mapsto [\\ & \operatorname{path2} \mapsto \{ \text{``value3''}, \text{``value4''} \}, \\ & \operatorname{path3} \mapsto \{ \text{``value4''}, \text{``value5''} \}]]] \end{aligned}
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CONSTANT Target

A record of target states

Variable target

A record of target masterships

Variable mastership

This section models *mastership* for the configuration service.

Mastership is used primarily to track the lifecycle of individual configuration targets and react to state changes on the southbound. Each target is assigned a master from the Node set, and masters can be unset when the target disconnects.

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Formal specification, constraints, and theorems.
InitSouthbound \triangleq
    \land target = [t \in DOMAIN \ Target \mapsto
                      [path \in \{\} \mapsto
                         [value \mapsto Nil]]
    \land mastership = [t \in DOMAIN \ Target \mapsto [master \mapsto Nil, \ term \mapsto 0]]
NextSouthbound \triangleq
    \vee \exists n \in Node:
         \exists t \in \text{DOMAIN } Target:
            SetMaster(n, t)
      \lor \exists t \in \text{domain } Target :
          UnsetMaster(t)
ASSUME \land IsFiniteSet(Node)
             \land \forall n \in Node:
                   \land n \notin \text{DOMAIN } Target
                   \land n \in \text{STRING}
Assume \land \forall t \in \text{domain } Target :
                   \land \ t \not\in \mathit{Node}
                   \land\ t\in\operatorname{string}
                   \land \ Target[t].persistent \in {\tt BOOLEAN}
                   \land \forall p \in \text{DOMAIN } Target[t].values :
                        IsFiniteSet(Target[t].values[p])
```

***** Modification History

 $\land mastership[t].master \neq Nil$

 \land UNCHANGED $\langle target \rangle$

 $\land mastership' = [mastership \ Except \ ![t].master = Nil]$

- * Last modified Sun Feb 20 09:09:52 PST 2022 by jordanhalterman
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