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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.

```
 \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}
```

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.

```
 \land mastership[t].master \neq Nil \\ \land mastership' = [mastership \ \texttt{except} \ ![t].master = Nil] \\ \land \ \texttt{unchanged} \ \langle target \rangle
```

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Formal specification, constraints, and theorems.
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```
 \begin{split} & Init \; \triangleq \\ & \land target = [t \in \mathsf{DOMAIN} \; Target \mapsto \\ & [path \in \{\} \mapsto \\ & [value \mapsto Nil]]] \\ & \land mastership = [t \in \mathsf{DOMAIN} \; Target \mapsto [master \mapsto Nil, \; term \mapsto 0]] \\ & Next \; \triangleq \\ & \lor \exists \, n \in Node : \\ & \exists \, t \in \mathsf{DOMAIN} \; Target : \\ & SetMaster(n, \; t) \\ & \lor \exists \, t \in \mathsf{DOMAIN} \; Target : \\ & UnsetMaster(t) \end{split}
```

- $\backslash * \ {\it Modification History}$
- * Last modified Sun Feb 20 07:53:43 PST 2022 by jordanhalterman
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