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MODULE *Node*

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EXTENDS *Naturals, Reals*

CONSTANTS *Sensor, Actuator, Gateway, BaseStation*

$Types \triangleq \{Sensor, Actuator, Gateway, BaseStation\}$

$Mode \triangleq \{\text{"Active"}, \text{"Inactive"}\}$

$Connectivity \triangleq \{\text{"Connected"}, \text{"NotConnected"}\}$

*DataRecord(type)* returns a record whose fields depend on the node type.

$DataRecord(type) \triangleq$

IF  $type = Sensor$  THEN

[*SnSensedDisaster*  $\mapsto$  BOOLEAN ,

*SnTransmittedDInfo*  $\mapsto$  BOOLEAN ]

ELSE IF  $type = Gateway$  THEN

[*GwReceivedDInfo*  $\mapsto$  BOOLEAN ,

*GwRelayedDinfoToBS*  $\mapsto$  BOOLEAN ,

*GwRelayedDinfoToActuator*  $\mapsto$  BOOLEAN ]

ELSE IF  $type = BaseStation$  THEN

[*BsReceivedDData*  $\mapsto$  BOOLEAN ,

*BsBroadcastDInfo*  $\mapsto$  BOOLEAN ]

ELSE

Actuator (or any other case)

[*ActuatorReceivedDInfo*  $\mapsto$  BOOLEAN ]

*Node(n, nodeType)* returns a node record for node id  $n$  and type  $nodeType$ .  $nodeType$  should be one of the constants: *Sensor, Actuator, Gateway, BaseStation*.

$Node(n, nodeType) \triangleq$

[*NodeID*  $\mapsto n$ ,

*NodeType*  $\mapsto nodeType$ ,

*NMode*  $\mapsto$  CHOOSE  $mode \in Mode : \text{TRUE}$ ,

*NConnectivity*  $\mapsto$  CHOOSE  $con \in Connectivity : \text{TRUE}$ ,

*DData*  $\mapsto DataRecord(nodeType)$

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