─────────────────── MODULE *ReliableCausalNetwork* ───────────────────

EXTENDS *Network*, *Naturals*

VARIABLES
    vc

$vector \triangleq [Replica \to Nat]$
$initvector \triangleq [r \in Replica \mapsto 0]$

$Init \triangleq \land NInit$
$\qquad\qquad \land vc = [r \in Replica \mapsto initvector]$

$Broadcast(r, m) \triangleq \land NBroadcast(r, m)$
$\qquad\qquad\qquad\qquad \land vc' = [vc \text{ EXCEPT } ![r][r] = @ + 1]$

$Deliver(r) \triangleq$
$\qquad \land \ incoming[r] \neq EmptyBag$
$\qquad \land \ \exists\, m \in BagToSet(incoming[r]) : \neg IfDeliverMsg(m, r)$
$\qquad\qquad \land \forall\, s \in Replica :$
$\qquad\qquad\qquad \lor m.vc[s] \leq vc[r][s]$
$\qquad\qquad\qquad \lor s \neq m.r$
$\qquad\qquad \land m.vc[m.r] = vc[r][m.r] + 1$
$\qquad\qquad \land vc' = [vc \text{ EXCEPT } ![r][m.r] = @ + 1]$
$\qquad\qquad \land msg' = [msg \text{ EXCEPT } ![r] = m]$
$\qquad \land \text{ UNCHANGED } \langle incoming \rangle$