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|----- MODULE CausalNetwork -----|
| EXTENDS Network, Naturals |
|-----|
| VARIABLES |
|   vc |
|-----|
| vector  $\triangleq$  [Replica  $\rightarrow$  Nat] |
| initVector  $\triangleq$  [r  $\in$  Replica  $\mapsto$  0] |
|-----|
| Init  $\triangleq$   $\wedge$  NInit |
|            $\wedge$  vc = [r  $\in$  Replica  $\mapsto$  initVector] |
| |
| Broadcast(r, m)  $\triangleq$   $\wedge$  NBroadcast(r, m) |
|            $\wedge$  vc' = [vc EXCEPT ![r][r] = @ + 1] |
| |
| Deliver(r)  $\triangleq$  |
|    $\wedge$  incoming[r]  $\neq$  EmptyBag |
|    $\wedge$   $\exists m \in \text{BagToSet}(\text{incoming}[r]) :$  |
|      $\wedge \forall s \in \text{Replica} :$  |
|        $\vee m.vc[s] \leq vc[r][s]$  |
|        $\vee s \neq m.r$  |
|        $\wedge m.vc[m.r] = vc[r][m.r] + 1$  |
|        $\wedge vc' = [vc \text{ EXCEPT } ![r][m.r] = @ + 1]$  |
|        $\wedge msg' = [msg \text{ EXCEPT } ![r] = m]$  |
|    $\wedge$  UNCHANGED  $\langle incoming \rangle$  |
|-----|
| \ * Modification History |
| \ * Last modified Tue May 14 11:16:58 CST 2019 by zfwang |
| \ * Last modified Mon May 06 16:07:03 CST 2019 by jjwellin |
| \ * Last modified Wed Apr 17 17:47:27 CST 2019 by xhdn |
| \ * Created Wed Mar 27 20:03:44 CST 2019 by jjwellin |

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