$\overline{}$ MODULE SEC $\overline{}$

EXTENDS $Naturals$

VARIABLES
  $updateset,$
  $new\_updateset$

$SECvars \triangleq \langle updateset, new\_updateset \rangle$

CONSTANTS
  $Replica$

$Uid \triangleq [r : Replica, seq : Nat]$ Update Operation ID

$OpUpdate(r) \triangleq new\_updateset[r]$ for op-based $CRDT$
$StateUpdate(r) \triangleq updateset[r]$ for state-based $CRDT$

$SECInit \triangleq$
  $\land updateset = [r \in Replica \mapsto \{\}]$
  $\land new\_updateset = [r \in Replica \mapsto \{\}]$

$SECUpdate(r, seq) \triangleq$
  $\land updateset' = [updateset \text{ EXCEPT } ![r] = @ \cup \{[r \mapsto r, seq \mapsto seq]\}]$
  $\land new\_updateset' = [new\_updateset \text{ EXCEPT } ![r] = @ \cup \{[r \mapsto r, seq \mapsto seq]\}]$

$SECSend(r) \triangleq$
  $\land \quad new\_updateset' = [updateset \text{ EXCEPT } ![r] = \{\}]$
  $\land \quad$ UNCHANGED $\langle updateset \rangle$

$SECDeliver(r, m) \triangleq$
  $\land updateset' = [updateset \text{ EXCEPT } ![r] = @ \cup m.update]$
  $\land$ UNCHANGED $\langle new\_updateset \rangle$

$SECFlush(r, seq) \triangleq$
  $\land updateset' = [updateset \text{ EXCEPT } ![r] = @ \cup \{[r \mapsto r, seq \mapsto seq]\}]$
  $\land prev\_updateset' = [prev\_updateset \text{ EXCEPT } ![r] = @ \cup \{[r \mapsto r, seq \mapsto seq]\}]$

$Sameupdate(r1, r2) \triangleq$
  $updateset[r1] = updateset[r2]$

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