MODULE *JupiterSerial*

Specification of serial views used by *AbsJupiter* and *CJupiter*.

EXTENDS *JupiterCtx*

VARIABLES

serial, *serial*[*r*]: the serial view of replica $r \in Replica$ about the serialization order established at the *Server*

cincomingSerial, *sincomingSerial*

$serialVars \triangleq \langle serial, cincomingSerial, sincomingSerial \rangle$

$commSerial \triangleq$ INSTANCE *CSComm* WITH $Msg \leftarrow Seq(Oid)$, $cincoming \leftarrow cincomingSerial$, $sincoming \leftarrow sincomingSerial$

$tb(oid1, oid2, sv) \triangleq$ Is $oid1$ totally ordered before $oid2$ according to the serial view sv (of some replica)?

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LET pos1 ≜ FirstIndexOfElementSafe(sv, oid1)   0 if oid1 is not in sv
    pos2 ≜ FirstIndexOfElementSafe(sv, oid2)   0 if oid2 is not in sv
IN  IF pos1 ≠ 0 ∧ pos2 ≠ 0   at the server or at a client but both are remote operations
    THEN pos1 < pos2
    ELSE IF pos1 = 0 ∧ pos2 = 0   at a client: both are local operations (may happen in AbsJupiter)
         THEN oid1.seq < oid2.seq
         ELSE pos1 ≠ 0   at a client: one is a remote operation and the other is a local operation
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$TypeOKSerial \triangleq$
$\quad \land serial \in [Replica \to Seq(Oid)]$
$\quad \land commSerial!TypeOK$

$InitSerial \triangleq$
$\quad \land serial = [r \in Replica \mapsto \langle\rangle]$
$\quad \land commSerial!Init$

$DoSerial(c) \triangleq$
$\quad$ UNCHANGED *serialVars*

$RevSerial(c) \triangleq$
$\quad \land commSerial!CRev(c)$
$\quad \land serial' = [serial \text{ EXCEPT } ![c] = Head(cincomingSerial[c])]$

$SRevSerial \triangleq$
$\quad \land$ LET $cop \triangleq Head(sincoming)$
$\quad\quad$ IN $\land serial' = [serial \text{ EXCEPT } ![Server] = Append(@, cop.oid)]$
$\quad\quad\quad \land commSerial!SSendSame(ClientOf(cop), serial'[Server])$
$\quad \land$ UNCHANGED *sincomingSerial*

* Modification History
* Last modified *Tue Jan* 08 20:58:24 *CST* 2019 by *hengxin*
* Created *Wed Dec* 05 21:03:01 *CST* 2018 by *hengxin*