

```

1  ┌────────────────── MODULE JupiterSerial ───────────────────┐
  This module contains definitions and operators for Jupiter protocols, i.e., AbsJupiter and
  CJupiter, which utilizes the serialization order at the Server to guide OTs.
7  EXTENDS JupiterCtx
8  ┌──────────────────┐
  tb: Is cop1 totally ordered before cop2? This can be determined according to the serial view (sv)
  of any replica.
13 tb(cop1, cop2, sv)  $\triangleq$ 
14   LET pos1  $\triangleq$  FirstIndexOfElementSafe(sv, cop1)
15   pos2  $\triangleq$  FirstIndexOfElementSafe(sv, cop2)
16   IN  IF pos1  $\neq$  0  $\wedge$  pos2  $\neq$  0 at the server or both are remote operations
17       THEN pos1 < pos2
18       ELSE IF pos1 = 0  $\wedge$  pos2 = 0 at a client: both are local operations (not happen in CJupiter)
19           THEN cop1.seq < cop2.seq
20           ELSE pos1  $\neq$  0 at a client: one is a remote operation and the other is a local operation
21 └──────────────────┐
22 VARIABLES
23   serial, serial[r]: the serial view of replica r  $\in$  Replica about the Server
24   cincomingSerial, sincomingSerial
26 serialVars  $\triangleq$   $\langle$ serial, cincomingSerial, sincomingSerial $\rangle$ 
27 commSerial  $\triangleq$  INSTANCE CSComm WITH Msg  $\leftarrow$  Seq(Oid),
28   cincoming  $\leftarrow$  cincomingSerial, sincoming  $\leftarrow$  sincomingSerial
29 └──────────────────┐
30 TypeOKSerial  $\triangleq$ 
31    $\wedge$  serial  $\in$  [Replica  $\rightarrow$  Seq(Oid)]
32    $\wedge$  commSerial! TypeOK
33 └──────────────────┐
34 InitSerial  $\triangleq$ 
35    $\wedge$  serial = [r  $\in$  Replica  $\mapsto$   $\langle \rangle$ ]
36    $\wedge$  commSerial! Init
38 DoSerial(c)  $\triangleq$ 
39   UNCHANGED  $\langle$ serialVars $\rangle$ 
41 RevSerial(c)  $\triangleq$ 
42    $\wedge$  commSerial! CRev(c)
43    $\wedge$  serial' = [serial EXCEPT ![c] = Head(cincomingSerial[c])]
45 SRevSerial  $\triangleq$ 
46    $\wedge$  LET cop  $\triangleq$  Head(sincoming)
47   IN   $\wedge$  serial' = [serial EXCEPT ![Server] = Append(@, cop.oid)]
48        $\wedge$  commSerial! SSendSame(cop.oid.c, serial'[Server])
49    $\wedge$  UNCHANGED  $\langle$ sincomingSerial $\rangle$ 
50 └──────────────────┐
  \ * Modification History

```

* Last modified *Wed Dec 12 21:04:36 CST 2018* by *hengxin*
* Created *Wed Dec 05 21:03:01 CST 2018* by *hengxin*