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1  |----- MODULE AJupiterImplXJupiter -----|
2  EXTENDS AJupiterExtended, StateSpace
3  |-----|
4  VARIABLES c2ss, s2ss

6  varsImpl  $\triangleq$   $\langle \textit{varsEx}, c2ss, s2ss \rangle$ 
7  |-----|
8  TypeOKImpl  $\triangleq$ 
9     $\wedge$  TypeOKEx
10    $\wedge \forall c \in \textit{Client} : \textit{IsSS}(c2ss[c]) \wedge \textit{IsSS}(s2ss[c])$ 
11 |-----|
12 InitImpl  $\triangleq$ 
13    $\wedge$  InitEx
14    $\wedge c2ss = [c \in \textit{Client} \mapsto \textit{EmptySS}]$ 
15    $\wedge s2ss = [c \in \textit{Client} \mapsto \textit{EmptySS}]$ 
16 |-----|
17 DoOpImpl(c, op)  $\triangleq$ 
18    $\wedge$  DoOpEx(c, op)
19    $\wedge$  LET cop  $\triangleq$  [op  $\mapsto$  op, oid  $\mapsto$  [c  $\mapsto$  c, seq  $\mapsto$  cseq[c], ctx  $\mapsto$  ds[c]]
20     IN c2ss' = [c2ss EXCEPT ![c] =
21        $\textcircled{\text{@}} \oplus [\textit{node} \mapsto \{ds'[c]\},$ 
22         edge  $\mapsto \{[from \mapsto ds[c], to \mapsto ds'[c], cop \mapsto cop]\}$ ]
23    $\wedge$  UNCHANGED s2ss

25 DoImpl(c)  $\triangleq$ 
26    $\wedge$  DoCtx(c)
27    $\wedge$  DoInt(DoOpImpl, c) TODO: refactor to use DoEx(c)
28    $\wedge$  UNCHANGED  $\langle \textit{sbuf}, \textit{srec} \rangle$ 

30 RevImpl(c)  $\triangleq$ 
31    $\wedge$  RevEx(c)
32    $\wedge$  LET m  $\triangleq$  Head(cincoming[c])
33     cBuf  $\triangleq$  cbuf[c]
34     cShiftedBuf  $\triangleq$  SubSeq(cBuf, m.ack + 1, Len(cBuf))
35     xform  $\triangleq$  xFormCopCopsSS(m.cop, cShiftedBuf) [lss, xss]
36     IN c2ss' = [c2ss EXCEPT ![c] =  $\textcircled{\text{@}} \oplus \textit{xform.xss}$ ]
37    $\wedge$  UNCHANGED s2ss

39 SRevImpl  $\triangleq$ 
40    $\wedge$  SRevEx
41    $\wedge$  LET m  $\triangleq$  Head(sincoming)
42     c  $\triangleq$  ClientOf(m.cop)
43     cBuf  $\triangleq$  sbuf[c]
44     cShiftedBuf  $\triangleq$  SubSeq(cBuf, m.ack + 1, Len(cBuf))
45     xform  $\triangleq$  xFormCopCopsSS(m.cop, cShiftedBuf) [lss, xss]
46     IN s2ss' = [cl  $\in$  Client  $\mapsto$ 

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47           IF  $cl = c$  THEN  $s2ss[cl] \oplus xform.xss$  ELSE  $s2ss[cl] \oplus xform.lss$ 
48        $\wedge$  UNCHANGED  $c2ss$ 
49   |-----|
50    $NextImpl \triangleq$ 
51        $\vee \exists c \in Client : DoImpl(c) \vee RevImpl(c)$ 
52        $\vee SRevImpl$ 
53
54    $FairnessImpl \triangleq$ 
55        $WF_{varsImpl}(SRevImpl \vee \exists c \in Client : RevImpl(c))$ 
56
57    $SpecImpl \triangleq InitImpl \wedge \Box[NextImpl]_{varsImpl} \wedge FairnessImpl$ 
58   |-----|
59    $XJ \triangleq$  INSTANCE  $XJupiter$  WITH  $Msg \leftarrow Cop,$ 
60        $cincoming \leftarrow cincomingXJ, sincoming \leftarrow sincomingXJ$ 
61
62   THEOREM  $SpecImpl \Rightarrow XJ!Spec$ 
63   |-----|
64
65   \ * Modification History
66   \ * Last modified Wed Jan 02 22:05:18 CST 2019 by hengxin
67   \ * Created Sat Dec 29 18:36:51 CST 2018 by hengxin

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