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1  ---------- MODULE XJupiterImplCJupiter ----------
   We show that XJupiter (XJupiterExtended) implements CJupiter.
5  EXTENDS XJupiterExtended
   Variables for defining refinement mapping from XJupiter to CJupiter.
9  VARIABLES
10     op2ss,    a function from an operation (represented by its Oid)
11               to the part of 2D state space produced while the operation is transformed
12     c2ssX     c2ssX[c]: redundant (eXtra) 2D state space maintained for client c ∈ Client

14 varsImpl ≜ ⟨varsEx, op2ss, c2ssX⟩
15 ----------
16 TypeOKImpl ≜
17     ∧ TypeOKEx
18     ∧ ∀ oid ∈ DOMAIN op2ss : oid ∈ Oid ∧ IsSS(op2ss[oid])
19     ∧ ∀ c ∈ Client : IsSS(c2ssX[c])
20 ----------
21 InitImpl ≜
22     ∧ InitEx
23     ∧ op2ss = ⟨⟩
24     ∧ c2ssX = [c ∈ Client ↦ [node ↦ {{}}, edge ↦ {}]]
25 ----------
   Ignore the lr field in edges of 2D state space ss.
29 IgnoreDir(ss) ≜
30     [ss EXCEPT !.edge = {[from ↦ e.from, to ↦ e.to, cop ↦ e.cop] : e ∈ @}]
31 ----------
32 DoImpl(c) ≜
33     ∧ DoEx(c)
34     ∧ UNCHANGED ⟨op2ss, c2ssX⟩

36 RevImpl(c) ≜
37     ∧   RevEx(c)
38     ∧   LET cop ≜ Head(cincoming[c])
39         IN  c2ssX′ = [c2ssX EXCEPT ![c] = @ ⊕ op2ss[cop.oid]]
40     ∧   UNCHANGED ⟨op2ss⟩

42 SRevImpl ≜
43     ∧ SRevEx
44     ∧ LET cop ≜ Head(sincoming)
45           c ≜ cop.oid.c
46       xform ≜ xForm(cop, s2ss[c], cur[Server], Remote)   TODO: performance!!!
47          ss ≜ xform[1]
48       IN  op2ss′ = op2ss @@ (cop.oid :> [node ↦ ss.node, edge ↦ ss.edge])
49     ∧ UNCHANGED ⟨c2ssX⟩
50 ----------
51 NextImpl ≜
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52      ∨ ∃ c ∈ Client : DoImpl(c) ∨ RevImpl(c)
53      ∨ SRevImpl

55  SpecImpl ≜ InitImpl ∧ □[NextImpl]_varsImpl
56      ∧ WF_varsImpl(SRevImpl ∨ ∃ c ∈ Client : RevImpl(c))

58  CJ ≜ INSTANCE CJupiter
59              WITH cincoming ← cincomingCJ,   sincoming needs no substitution
60                   css ← [r ∈ Replica ↦
61                              IF r = Server
62                               THEN IgnoreDir(SetReduce( ⊕ , Range(s2ss),
63                                                  [node ↦ {{}}, edge ↦ {}]))
64                               ELSE IgnoreDir(c2ss[r] ⊕ c2ssX[r])]

66  THEOREM SpecImpl ⇒ CJ!Spec
67  ──────────────────────────────────────────────────────────────────────
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* Modification History
* *Last* modified *Fri Nov* 16 14:15:59 *CST* 2018 by *hengxin*
* Created *Fri Oct* 26 15:00:19 *CST* 2018 by *hengxin*