```
1  ──────────── MODULE XJupiterImplCJupiter ────────────
   We show that XJupiter (XJupiterExtended) implements CJupiter.
5  EXTENDS XJupiterExtended
6  ──────────────────────────────────────────────────────
7  VARIABLES
8      op2ss,    a function from an operation (represented by its Oid)
9                to the part of 2D state space produced while the operation is transformed
10     c2ssX     c2ssX[c]: redundant (eXtra) 2D state space maintained for client c ∈ Client

12 varsImpl ≜ ⟨varsEx, op2ss, c2ssX⟩
13 ──────────────────────────────────────────────────────
14 TypeOKImpl ≜
15     ∧ TypeOKEx
16     ∧ ∀ oid ∈ DOMAIN op2ss : oid ∈ Oid ∧ IsSS(op2ss[oid])
17     ∧ ∀ c ∈ Client : IsSS(c2ssX[c])
18 ──────────────────────────────────────────────────────
19 InitImpl ≜
20     ∧ InitEx
21     ∧ op2ss = ⟨⟩
22     ∧ c2ssX = [c ∈ Client ↦ EmptyGraph]

24 DoImpl(c) ≜
25     ∧ DoEx(c)
26     ∧ UNCHANGED ⟨op2ss, c2ssX⟩

28 RevImpl(c) ≜
29     ∧   RevEx(c)
30     ∧   LET cop ≜ Head(cincoming[c])
31         IN  c2ssX′ = [c2ssX EXCEPT ![c] = @ ⊕ op2ss[cop.oid]]
32     ∧   UNCHANGED op2ss

34 SRevImpl ≜
35     ∧ SRevEx
36     ∧ LET cop ≜ Head(sincoming)
37           c ≜ cop.oid.c
38       xform ≜ xForm(cop, s2ss[c], ds[Server])   TODO: performance!!!
39          ss ≜ xform.xss
40       IN  op2ss′ = op2ss @@ (cop.oid :> [node ↦ ss.node, edge ↦ ss.edge])
41     ∧ UNCHANGED c2ssX
42 ──────────────────────────────────────────────────────
43 NextImpl ≜
44     ∨ ∃ c ∈ Client : DoImpl(c) ∨ RevImpl(c)
45     ∨ SRevImpl

47 FairnessImpl ≜
48     ∧ WF_varsImpl(SRevImpl ∨ ∃ c ∈ Client : RevImpl(c))
```

```
SpecImpl ≜ InitImpl ∧ □[NextImpl]_varsImpl  ∧ FairnessImpl

CJ ≜ INSTANCE CJupiter
        WITH cincoming ← cincomingCJ,   sincoming needs no substitution
             css ← [r ∈ Replica ↦
                        IF r = Server
                         THEN SetReduce(⊕, Range(s2ss), EmptyGraph)
                         ELSE c2ss[r] ⊕ c2ssX[r]]

THEOREM SpecImpl ⇒ CJ!Spec
```

* Modification History
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