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1 ┌─────────────────── MODULE XJupiterImplCJupiter ───────────────────┐
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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 $c \in Client$

14 $varsImpl \triangleq \langle varsEx,\ op2ss,\ c2ssX \rangle$

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16 $TypeOKImpl \triangleq$

17     $\wedge\ TypeOKEx$

18     $\wedge\ \forall\ oid \in \text{DOMAIN}\ op2ss : oid \in Oid \wedge IsSS(op2ss[oid])$

19     $\wedge\ \forall\ c \in Client : IsSS(c2ssX[c])$

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21 $InitImpl \triangleq$

22     $\wedge\ InitEx$

23     $\wedge\ op2ss\ = \langle\rangle$

24     $\wedge\ c2ssX = [c \in Client \mapsto EmptySS]$

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Ignore the *lr* field in edges of $2D$ state space *ss*.

29 $IgnoreDir(ss) \triangleq$

30     $[ss\ \text{EXCEPT}\ !.edge = \{[from \mapsto e.from,\ to \mapsto e.to,\ cop \mapsto e.cop] : e \in @\}]$

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32 $DoImpl(c) \triangleq$

33     $\wedge\ DoEx(c)$

34     $\wedge\ \text{UNCHANGED}\ \langle op2ss,\ c2ssX \rangle$

36 $RevImpl(c) \triangleq$

37     $\wedge\ \ \ \ RevEx(c)$

38     $\wedge\ \ \ \ \text{LET}\ cop \triangleq Head(cincoming[c])$

39         $\text{IN}\ \ \ c2ssX' = [c2ssX\ \text{EXCEPT}\ ![c] = @ \oplus op2ss[cop.oid]]$

40     $\wedge\ \ \ \ \text{UNCHANGED}\ op2ss$

42 $SRevImpl \triangleq$

43     $\wedge\ SRevEx$

44     $\wedge\ \text{LET}\ cop\ \triangleq\ Head(sincoming)$

45            $c\ \triangleq\ cop.oid.c$

46       $xform\ \triangleq\ xForm(cop,\ s2ss[c],\ cur[Server],\ Remote)$ *TODO*: performance!!!

47         $ss\ \triangleq\ xform[1]$

48      $\text{IN}\ \ \ op2ss' = op2ss\ @@\ (cop.oid :> [node \mapsto ss.node,\ edge \mapsto ss.edge])$

49     $\wedge\ \text{UNCHANGED}\ c2ssX$

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51 $NextImpl \triangleq$

52        $\lor \exists\, c \in Client : DoImpl(c) \lor RevImpl(c)$

53        $\lor\ SRevImpl$

55 $FairnessImpl \;\triangleq$

56        $\land\ \mathrm{WF}_{varsImpl}(SRevImpl \lor \exists\, c \in Client : RevImpl(c))$

58 $SpecImpl \;\triangleq\; InitImpl \land \Box[NextImpl]_{varsImpl}\ \ \boxed{\land\ FairnessImpl}$

60 $CJ \;\triangleq\; \textsc{instance}\ CJupiter$

61           $\textsc{with}\ cincoming \leftarrow cincomingCJ,\quad \boxed{sincoming\ \text{needs no substitution}}$

62                $css \leftarrow [r \in Replica \mapsto$

63                     $\textsc{if}\ \ r = Server$

64                        $\textsc{then}\ IgnoreDir(SetReduce(\,\oplus\,,\ Range(s2ss),\ EmptySS))$

65                        $\textsc{else}\ \ IgnoreDir(c2ss[r] \oplus c2ssX[r])]$

67 $\textsc{theorem}\ SpecImpl \Rightarrow CJ!Spec$

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* Modification History

* Last modified Sat *Dec* 15 17:56:39 *CST* 2018 by *hengxin*

* Created *Fri Oct* 26 15:00:19 *CST* 2018 by *hengxin*