MODULE *NJupiterImplXJupiter*

EXTENDS *NJupiterExtended*, *GraphStateSpace*

VARIABLES $c2ss$, $s2ss$

$varsImpl \triangleq \langle varsEx, c2ss, s2ss \rangle$

$TypeOKImpl \triangleq$
$\land\ TypeOKEx$
$\land\ \forall\, c \in Client : IsSS(c2ss[c]) \land IsSS(s2ss[c])$

$InitImpl \triangleq$
$\land\ InitEx$
$\land\ c2ss = [c \in Client \mapsto EmptySS]$
$\land\ s2ss = [c \in Client \mapsto EmptySS]$

$DoOpImpl(c, op) \triangleq$
$\land\ DoOpEx(c, op)$
$\land$ LET $cop \triangleq [op \mapsto op,\ oid \mapsto [c \mapsto c,\ seq \mapsto cseq[c]],\ ctx \mapsto ds[c]]$
IN $c2ss' = [c2ss$ EXCEPT $![c] =$
$@ \oplus [node \mapsto \{ds'[c]\},$
$edge \mapsto \{[from \mapsto ds[c],\ to \mapsto ds'[c],\ cop \mapsto cop]\}]]$
$\land$ UNCHANGED $s2ss$

$ClientPerformImpl(c, m) \triangleq$
$\land$ LET $xform \triangleq xFormCopCops(m.cop, RemoveAckedOps(cbuf[c], m.ack))$ [xcop, *xss*, *lss*]
IN $c2ss' = [c2ss$ EXCEPT $![c] = @ \oplus xform.xss]$
$\land$ UNCHANGED $s2ss$

$ServerPerformImpl(m) \triangleq$
$\land$ LET $c \triangleq ClientOf(m.cop)$
$xform \triangleq xFormCopCops(m.cop, RemoveAckedOps(sbuf[c], m.ack))$ [xcop, *xss*, *lss*]
IN $s2ss' = [cl \in Client \mapsto$ IF $cl = c$ THEN $s2ss[cl] \oplus xform.xss$
ELSE $s2ss[cl] \oplus xform.lss]$
$\land$ UNCHANGED $c2ss$

$DoImpl(c) \triangleq$
$\land\ DoCtx(c)$
$\land\ DoInt(DoOpImpl, c)$ *TODO*: refactor to use $DoEx(c)$; cannot use two *DoInt*
$\land$ UNCHANGED $\langle sbuf, sack \rangle$

$RevImpl(c) \triangleq$
$\land\quad RevEx(c)$
$\land\quad RevInt(ClientPerformImpl, c)$

$SRevImpl \triangleq$
$\land\ SRevEx$

$\land\ SRevInt(ServerPerformImpl)$

$NextImpl \triangleq$
$\lor \exists\, c \in Client : DoImpl(c) \lor RevImpl(c)$
$\lor\ SRevImpl$

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

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

$XJ \triangleq$ INSTANCE $XJupiter$ WITH $Msg \leftarrow Cop$,
$cincoming \leftarrow cincomingXJ$, $sincoming \leftarrow sincomingXJ$

THEOREM $SpecImpl \Rightarrow XJ!Spec$

* Modification History
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