
MODULE *JupiterCtx*

Definitions for context-based *Jupiter* protocols, including *AbsJupiter*, *CJupiter*, and *XJupiter*.
EXTENDS *JupiterInterface*, *OT*

VARIABLES

cseq, *cseq*[*c*]: local sequence number at client *c* ∈ *Client*
ds *ds*[*r*]: document state (*i.e.*, a set of *Oids*) of replica *r* ∈ *Replica*

ctxVars \triangleq $\langle cseq, ds \rangle$

Oid \triangleq [*c* : *Client*, *seq* : *Nat*] operation identifier
Cop \triangleq [*op* : *Op* ∪ {*Nop*}, *oid* : *Oid*, *ctx* : SUBSET *Oid*] context-based *op*
ClientOf(*cop*) \triangleq *cop.oid.c*
COT(*lcop*, *rcop*) \triangleq OT of *lcop* ∈ *Cop* against *rcop* ∈ *Cop*
[*lcop* EXCEPT !.*op* = *OT*(*lcop.op*, *rcop.op*), !.*ctx* = @ ∪ {*rcop.oid*}]
UpdateDS(*r*, *oid*) \triangleq update *ds*[*r*] to include new *oid* ∈ *Oid*
ds' = [*ds* EXCEPT ![*r*] = @ ∪ {*oid*}]

TypeOKCtx \triangleq
 $\wedge cseq \in [Client \rightarrow Nat]$
 $\wedge ds \in [Replica \rightarrow SUBSET\ Oid]$

InitCtx \triangleq
 $\wedge cseq = [c \in Client \mapsto 1]$
 $\wedge ds = [r \in Replica \mapsto \{\}]$

DoCtx(*c*) \triangleq
 $\wedge cseq' = [cseq\ EXCEPT\ ![c] = @ + 1]$
 $\wedge UpdateDS(c, [c \mapsto c, seq \mapsto cseq[c]])$ *oid* for newly generated operation

RevCtx(*c*) \triangleq
 $\wedge UNCHANGED\ cseq$
 $\wedge UpdateDS(c, Head(cincoming[c]).oid)$

SRevCtx \triangleq
 $\wedge UNCHANGED\ cseq$
 $\wedge UpdateDS(Server, Head(sincoming).oid)$

ClientConstraint \triangleq Each client generates at most 2 operations.
 $\forall c \in Client : cseq[c] \leq 3$

\ * Modification History
\ * Last modified Tue Jan 29 10:11:36 CST 2019 by *hengxin*
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