

Resilient distributed finish as implemented in *PPoPP14* See
FinishState.FinishResilientDistributed

EXTENDS *Integers, Sequences*

CONSTANTS *PLACE, MXFINISHES, PROG_HOME, BACKUP*

VARIABLES *fid, fstates, msgs, thrds, pstate, waitForMsgs, killed, fbackups, seq*

INSTANCE *Commons*

Terminated \triangleq
 $\wedge fstates[fid].status = \text{"forgotten"}$

Running \triangleq
 $\wedge fstates[fid].status = \text{"waiting"}$

IsRoot \triangleq
 $\wedge fstates[fid].type = \text{"distroot"}$

LastActivity \triangleq
 $\wedge fstates[fid].count = 1$

SendMasterTransit(dst) \triangleq
 $\wedge dst \neq fstates[fid].here$
 $\wedge \text{LET } parentId \triangleq fstates[fid].parent$
 $\quad here \triangleq fstates[fid].here$
 $\quad root \triangleq fstates[fid].root$
 $\quad rootPlace \triangleq GetFinishHome(fstates[fid].root)$
IN $\wedge SendMsg([mid \mapsto seq.mseq,$
 $\quad src \mapsto here,$
 $\quad dst \mapsto rootPlace,$
 $\quad target \mapsto dst,$
 $\quad fid \mapsto root,$
 $\quad adoptedFID \mapsto NotID,$
 $\quad type \mapsto \text{"masterTransit"}])$
 $\wedge waitForMsgs' = waitForMsgs \cup \{[src \mapsto rootPlace,$
 $\quad dst \mapsto here,$
 $\quad target \mapsto dst,$
 $\quad fid \mapsto root,$
 $\quad type \mapsto \text{"masterTransitDone"}]\}$
 $\wedge IncrMSEQ(1)$

SendMasterTransitToLive(src, actId, inMsg, here, root) \triangleq
LET $rootPlace \triangleq GetFinishHome(root)$
IN $\wedge ReplaceMsg(inMsg,$
 $\quad [mid \mapsto seq.mseq,$
 $\quad src \mapsto here,$
 $\quad source \mapsto src,$


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                                THEN TRUE
                                ELSE FALSE]

needed for the local path of Runtime.runAsync
NotifyLocalActivitySpawnAndCreation(here, act)  $\triangleq$ 
   $\wedge fstates[fid].status = \text{"waiting"}$ 
   $\wedge fstates' = [fstates \text{ EXCEPT } ![fid].count = @ + 1]$ 

NotifySubActivitySpawn(dst)  $\triangleq$ 
   $\wedge fstates[fid].status = \text{"waiting"}$ 
   $\wedge fstates' = [fstates \text{ EXCEPT } ![fid].isGlobal = \text{TRUE}]$ 
   $\wedge \text{SendMasterTransit}(\text{dst})$ 

AllocRemoteAndNotifyRemoteActivityCreation(src, act, inMsg, type, here, parent, root)  $\triangleq$ 
   $\wedge \text{SendMasterTransitToLive}(\text{src}, \text{act.aid}, \text{inMsg}, \text{here}, \text{root})$ 
   $\wedge \text{here} \neq \text{NotPlace}$ 
   $\wedge \text{type} = \text{"distremote"}$ 
   $\wedge \text{Alloc}(\text{type}, \text{here}, \text{parent}, \text{root})$ 
  create and notify

NotifyActivityTermination(finishEnd)  $\triangleq$ 
   $\wedge fstates[fid].status = \text{"waiting"}$ 
   $\wedge fstates[fid].count > 0$ 
   $\wedge \text{IF } \text{LastActivity} \wedge \neg fstates[fid].isGlobal$ 
    THEN  $\wedge fstates' = [fstates \text{ EXCEPT } ![fid].count = @ - 1,$ 
       $![fid].status = \text{"forgotten"}]$ 
       $\wedge msgs' = msgs$ 
       $\wedge seq' = seq$ 
       $\wedge \text{waitForMsgs}' = \text{waitForMsgs}$ 
    ELSE IF LastActivity  $\wedge fstates[fid].isGlobal$ 
      THEN  $\wedge \text{SendMasterLiveToCompleted}(\text{finishEnd})$ 
         $\wedge fstates' = [fstates \text{ EXCEPT } ![fid].count = @ - 1,$ 
           $![fid].status = \text{IF } fstates[fid].type = \text{"distremote"}$ 
            THEN  $\text{"forgotten"}$ 
            ELSE  $\text{"pendingRelease"}]$ 
        ELSE  $\wedge fstates' = [fstates \text{ EXCEPT } ![fid].count = @ - 1]$ 
           $\wedge msgs' = msgs$ 
           $\wedge seq' = seq$ 
           $\wedge \text{waitForMsgs}' = \text{waitForMsgs}$ 

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\ * Modification History
\ * Last modified Wed Dec 13 14:45:49 AEDT 2017 by u5482878
\ * Last modified Tue Dec 05 17:41:47 AEDT 2017 by shamouda
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