

chain-replication-acks-refines^{13,45}

$\forall es:ES, Cmd, Rsp:Type, isupdate:(Cmd \rightarrow \mathbb{B}), Delta:((\{c:Cmd \mid \uparrow(isupdate(c))\} List) \rightarrow Rsp),$
 $Q:((\{c:Cmd \mid \uparrow(isupdate(c))\} List) \rightarrow \{c:Cmd \mid \neg(\uparrow(isupdate(c)))\} \rightarrow Rsp),$
 $In:AbsInterface(Cmd), Out:AbsInterface(Rsp), Sys:AbsInterface(Cmd List),$
 $Ack:AbsInterface(\mathbb{N}), f:sys\text{-}antecedent(es; Sys), g:sys\text{-}antecedent(es; Ack).$
 $chain\text{-}replication\text{-}acks\{i:l\}$
 $(es; Cmd; Rsp; isupdate; In; Out; Sys; Ack; f; g; Delta; Q)$
 $\Rightarrow abstract\text{-}chain\text{-}replication\{i:l\}$
 $(es; Cmd; Rsp; isupdate; In; Out; Sys; f; Delta; Q)$