abstract-chain-replication[13,45]

abstract-chain-replication{i:l}
(es; Cmd; Rsp; $isupdate$; In; Out; Sys; f; $Delta$; Q)
$\equiv_{\text{def}}$ fifo-antecedent(es;Sys;f)
& ($\forall u$:E(Sys). ($f(u) = u$) $\iff$ ($\uparrow(u \in_b In)$))
& (E(In) $\subseteq$r E(Sys))
& (E(Out) $\subseteq$r E(Sys))
& ($\forall e$:E(In). ($\neg(\uparrow(isupdate(In(e)))))$ $\Rightarrow$ ($\uparrow(e \in_b Out)$))
& ($\forall e$:E(Sys). ($\neg(\uparrow(e \in_b In))$) $\Rightarrow$ (loc($f(e)$) = loc(e)) $\Rightarrow$ ($\neg(\uparrow(e \in_b Out))$))
& input-forwarding{i:l}
(es; Cmd; Sys; $isupdate$; In; f)
& ($\exists chain$:E(Sys)$\rightarrow$(Id List). chain-consistent(f;$chain$))
& ($\forall e$:E(Out).
(is-query(In;$isupdate$;e)
$\Rightarrow$ ($Out(e) = Q$(filter($isupdate$;es-interface-history(es; Sys; e)),$In(e)$))))
& (($\neg$is-query(In;$isupdate$;e))
$\Rightarrow$ ($Out(e) = Delta$(filter($isupdate$;es-interface-history(es; Sys; e))))))

clarification:

abstract-chain-replication{i:l}
(es; Cmd; Rsp; $isupdate$; In; Out; Sys; f; $Delta$; Q)
$\equiv_{\text{def}}$ fifo-antecedent(es;Sys;f)
& ($\forall u$:es-E-interface(es;Sys). ($f(u) = u \in$ es-E(es)) $\iff$ ($\uparrow(u \in_b In)$))
& (es-E-interface(es;In) $\subseteq$r es-E-interface(es;Sys))
& (es-E-interface(es;Out) $\subseteq$r es-E-interface(es;Sys))
& ($\forall e$:es-E-interface(es;In). ($\neg(\uparrow(isupdate(In(e)))))$ $\Rightarrow$ ($\uparrow(e \in_b Out)$))
& ($\forall e$:es-E-interface(es;Sys).
($\neg(\uparrow(e \in_b In))$) $\Rightarrow$ (es-loc(es; ($f(e)$)) = es-loc(es; e) $\in$ Id) $\Rightarrow$ ($\neg(\uparrow(e \in_b Out))$))
& input-forwarding{i:l}
(es; Cmd; Sys; $isupdate$; In; f)
& ($\exists chain$:es-E-interface(es;Sys)$\rightarrow$(Id List)
chain-consistent(es;Sys;In;$isupdate$;Out;f;$chain$))
& ($\forall e$:es-E-interface(es;Out).
(is-query(In;$isupdate$;e)
$\Rightarrow$ ($Out(e) = Q$(filter($isupdate$;es-interface-history(es; Sys; e)),$In(e)$) $\in Rsp$))
& (($\neg$is-query(In;$isupdate$;e))
$\Rightarrow$ ($Out(e) = Delta$(filter($isupdate$;es-interface-history(es; Sys; e))) $\in Rsp$)))

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http://www.nuprl.org/FDLcontent/p0_963683_/p28_855969_{abstract-chain-replication}.html