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**An Event-B Specification of TCTM\_flow @ Date: 31 Oct 2008 @ Time: 01:29:41 PM**  
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**MACHINE** TCTM\_flow

**SEES** TCTM\_flow\_context

**VARIABLES**

*TCbuffer*  
*TMbuffer*  
*TCpool*  
*TMpool*  
*TCstatus*

**INVARIANTS**

*inv1* :  $TCbuffer \in TC\_BUFFER\_ADDRESSES \rightarrow TC\_SET$   
*inv2* :  $TMbuffer \in TM\_BUFFER\_ADDRESSES \rightarrow TM\_SET$   
*inv3* :  $TCpool \in TCTM\_POOL\_ADDRESSES \rightarrow TC\_SET$   
*inv4* :  $TMpool \in TCTM\_POOL\_ADDRESSES \rightarrow TM\_SET$   
*inv5* :  $TCstatus \in TCTM\_POOL\_ADDRESSES \rightarrow TC\_STATUS$   
*inv6* :  $dom(TCstatus) = dom(TCpool)$   
*inv7* :  $dom(TCpool) \cap dom(TMpool) = \emptyset$   
*inv8* :  $\forall tch \cdot tch \in dom(TCpool) \wedge TCstatus(tch) = Waiting\_for\_Execution \Rightarrow Valid\_TC(TCpool(tch)) = TRUE$

**EVENTS**

**INITIALISATION**

**BEGIN**

*act1* :  $TCbuffer := \emptyset$   
*act2* :  $TMbuffer := \emptyset$   
*act3* :  $TCpool := \emptyset$   
*act4* :  $TMpool := \emptyset$   
*act5* :  $TCstatus := \emptyset$

**END**

**EVENT** env\_Receive\_TC

**ANY**

*tc*  
*tc\_pointer*

**WHERE**

*grd1* :  $tc \in TC\_SET$   
*grd2* :  $tc\_pointer \in TC\_BUFFER\_ADDRESSES$   
*grd3* :  $tc\_pointer \notin dom(TCbuffer)$

**THEN**

*act1* :  $TCbuffer(tc\_pointer) := tc$

**END**

**EVENT** Poll\_TC

**ANY**

*tc\_pointer*  
*tc\_handler*

**WHERE**

$grd1 : tc\_pointer \in dom(TCbuffer)$   
 $grd2 : tc\_handler \in TCTM\_POOL\_ADDRESSES$   
 $grd3 : tc\_handler \notin dom(TCpool)$   
 $grd4 : tc\_handler \notin dom(TMpool)$   
**THEN**  
 $act1 : TCpool(tc\_handler) := TCbuffer(tc\_pointer)$   
 $act3 : TCstatus(tc\_handler) := Unchecked$   
 $act2 : TCbuffer := \{tc\_pointer\} \triangleleft TCbuffer$   
**END**

**EVENT Report\_TC\_check\_ok**

**ANY**  
 $tc\_handler$   
 $tm\_handler$   
 $tm$   
**WHERE**  
 $grd1 : tc\_handler \in dom(TCpool)$   
 $grd2 : tm\_handler \in TCTM\_POOL\_ADDRESSES$   
 $grd3 : tm \in TM\_SET$   
 $grd4 : tm\_handler \notin dom(TCpool)$   
 $grd5 : tm\_handler \notin dom(TMpool)$   
 $grd6 : TCstatus(tc\_handler) = Unchecked$   
 $grd7 : Valid\_TC(TCpool(tc\_handler)) = TRUE$   
**THEN**  
 $act1 : TCstatus(tc\_handler) := Waiting\_for\_Execution$   
 $act2 : TMpool(tm\_handler) := tm$   
**END**

**EVENT Report\_TC\_check\_fail**

**ANY**  
 $tc\_handler$   
 $tm\_handler$   
 $tm$   
**WHERE**  
 $grd1 : tc\_handler \in dom(TCpool)$   
 $grd2 : tm\_handler \in TCTM\_POOL\_ADDRESSES$   
 $grd3 : tm \in TM\_SET$   
 $grd4 : tm\_handler \notin dom(TCpool)$   
 $grd5 : tm\_handler \notin dom(TMpool)$   
 $grd6 : TCstatus(tc\_handler) = Unchecked$   
 $grd7 : Valid\_TC(TCpool(tc\_handler)) = FALSE$   
**THEN**  
 $act1 : TCpool := \{tc\_handler\} \triangleleft TCpool$   
 $act3 : TCstatus := \{tc\_handler\} \triangleleft TCstatus$   
 $act2 : TMpool(tm\_handler) := tm$   
**END**

**EVENT TC\_Execution\_Success**

**ANY**  
 $tc\_handler$   
**WHERE**  
 $grd1 : tc\_handler \in dom(TCpool)$   
 $grd2 : TCstatus(tc\_handler) = Waiting\_for\_Execution$   
**THEN**  
 $act1 : TCstatus(tc\_handler) := Successfully\_Executed$   
**END**

**EVENT Reset\_Output\_Buffer****ANY***tc\_handler***WHERE***grd1* : *tc\_handler*  $\in \text{dom}(TCpool)$ *grd2* : *TCstatus*(*tc\_handler*) = *Waiting\_for\_Execution***THEN***act1* : *TMbuffer* :=  $\emptyset$ *act2* : *TCstatus*(*tc\_handler*) := *Successfully\_Executed***END****EVENT TC\_Execution\_Failure****ANY***tc\_handler***WHERE***grd1* : *tc\_handler*  $\in \text{dom}(TCpool)$ *grd2* : *TCstatus*(*tc\_handler*) = *Waiting\_for\_Execution***THEN***act1* : *TCstatus*(*tc\_handler*) := *Execution\_Failed***END****EVENT Report\_TC\_execution\_success****ANY***tc\_handler**tm\_handler**tm***WHERE***grd1* : *tc\_handler*  $\in \text{dom}(TCpool)$ *grd2* : *tm\_handler*  $\in TCTM\_POOL\_ADDRESSES$ *grd3* : *tm*  $\in TM\_SET$ *grd4* : *TCstatus*(*tc\_handler*) = *Successfully\_Executed**grd5* : *tm\_handler*  $\notin \text{dom}(TCpool)$ *grd6* : *tm\_handler*  $\notin \text{dom}(TMpool)$ **THEN***act1* : *TCpool* := {*tc\_handler*}  $\triangleleft TCpool$ *act2* : *TCstatus* := {*tc\_handler*}  $\triangleleft TCstatus$ *act3* : *TMpool*(*tm\_handler*) := *tm***END****EVENT Report\_TC\_execution\_failure****ANY***tc\_handler**tm\_handler**tm***WHERE***grd1* : *tc\_handler*  $\in \text{dom}(TCpool)$ *grd2* : *tm\_handler*  $\in TCTM\_POOL\_ADDRESSES$ *grd3* : *tm*  $\in TM\_SET$ *grd4* : *TCstatus*(*tc\_handler*) = *Execution\_Failed**grd5* : *tm\_handler*  $\notin \text{dom}(TCpool)$ *grd6* : *tm\_handler*  $\notin \text{dom}(TMpool)$ **THEN***act1* : *TCpool* := {*tc\_handler*}  $\triangleleft TCpool$ *act2* : *TCstatus* := {*tc\_handler*}  $\triangleleft TCstatus$ *act3* : *TMpool*(*tm\_handler*) := *tm***END**

**EVENT Store\_Data****ANY***tm\_handler**tm***WHERE***grd1* : *tm\_handler*  $\in$  *TCTM\_POOL\_ADDRESSES**grd2* : *tm*  $\in$  *TM\_SET**grd3* : *tm\_handler*  $\notin$  *dom(TCpool)**grd4* : *tm\_handler*  $\notin$  *dom(TMpool)***THEN***act1* : *TMpool(tm\_handler)* := *tm***END****EVENT Pass\_TM****ANY***tm\_handler**tm\_pointer***WHERE***grd1* : *tm\_handler*  $\in$  *dom(TMpool)**grd2* : *tm\_pointer*  $\in$  *TM\_BUFFER\_ADDRESSES**grd3* : *tm\_pointer*  $\notin$  *dom(TMbuffer)***THEN***act2* : *TMbuffer(tm\_pointer)* := *TMpool(tm\_handler)**act1* : *TMpool* := {*tm\_handler*}  $\triangleleft$  *TMpool***END****EVENT Drop\_TM****ANY***tm\_handler***WHERE***grd1* : *tm\_handler*  $\in$  *dom(TMpool)***THEN***act1* : *TMpool* := {*tm\_handler*}  $\triangleleft$  *TMpool***END****EVENT env\_Deliver\_TM****ANY***tm\_pointer***WHERE***grd1* : *tm\_pointer*  $\in$  *dom(TMbuffer)***THEN***act1* : *TMbuffer* := {*tm\_pointer*}  $\triangleleft$  *TMbuffer***END****END**