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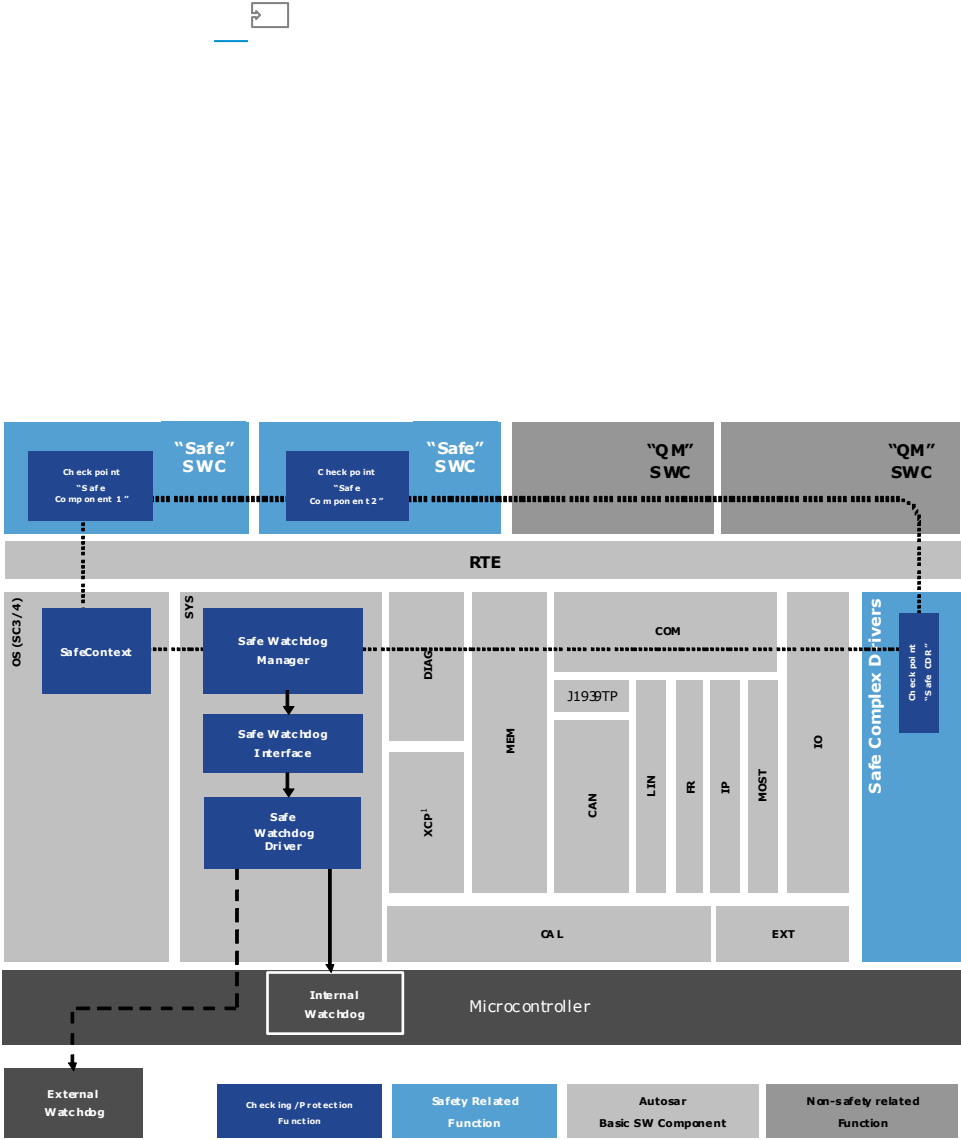


Fig 1: Safe Watchdog Manager Stack in an AUTOSAR environment



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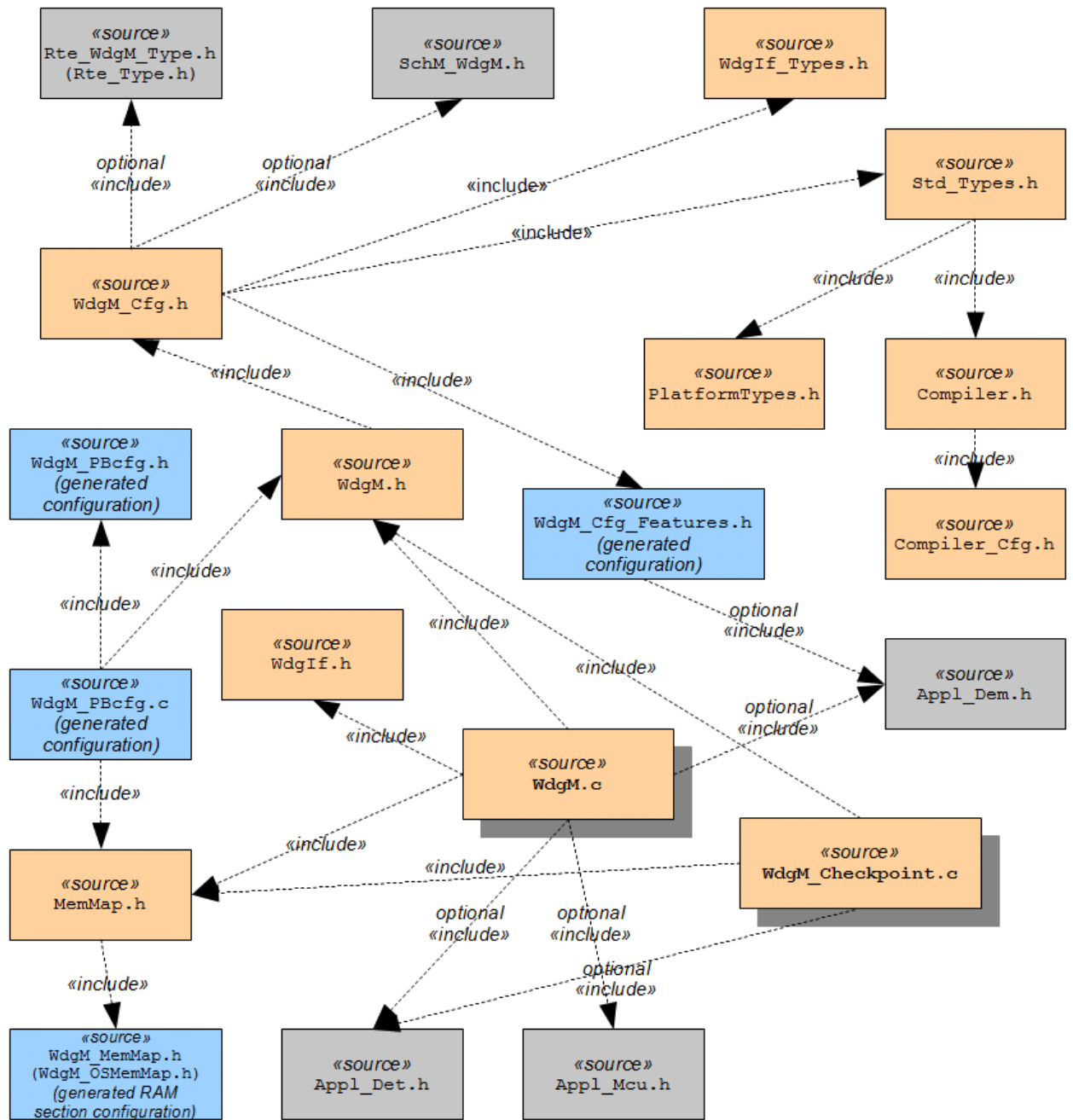


Fig. 3: File structure of the S-WdgM module

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WdgM.c

WdgM_Checkpoint.c	
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WdgM.h

WdgM_Cfg.h	
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WdgM_MemMap.h
WdgM_OSMemMap.h

MemMap.h

- WdgM_MemMap.h
- WdgM_OSMemMap.h

WdgM_Cfg_Features.h	
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WdgM_PBcfg.h

WdgM_PBcfg.c	
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WdgIf_Types.h

Std_Types.h	
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Compiler.h

Compiler_Cfg	
PlatformTypes.h	
MemMap.h	WdgM_MemMap.h
Appl_Det.h	Det_ReportError()
Appl_Dem.h	Dem_ReportErrorStatus() WdgM.c WdgM_Cfg_Features.h
Appl_Mcu.h	Mcu_PerformReset()
Rte_Type.h Rte_WdgM_Type.h	▪ Rte_Type.h ▪ Rte_WdgM_Type.h
SchM_WdgM.h	
▪ Det_ReportError()	
▪ Dem_ReportErrorStatus()	
▪ Mcu_PerformReset()	
Appl_	

WdgM_CheckpointReached() 

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temperature_control:

- temperature_control
- temperature_needs_correction read_temperature
- heater_adjusted_successfully
 read_temperature

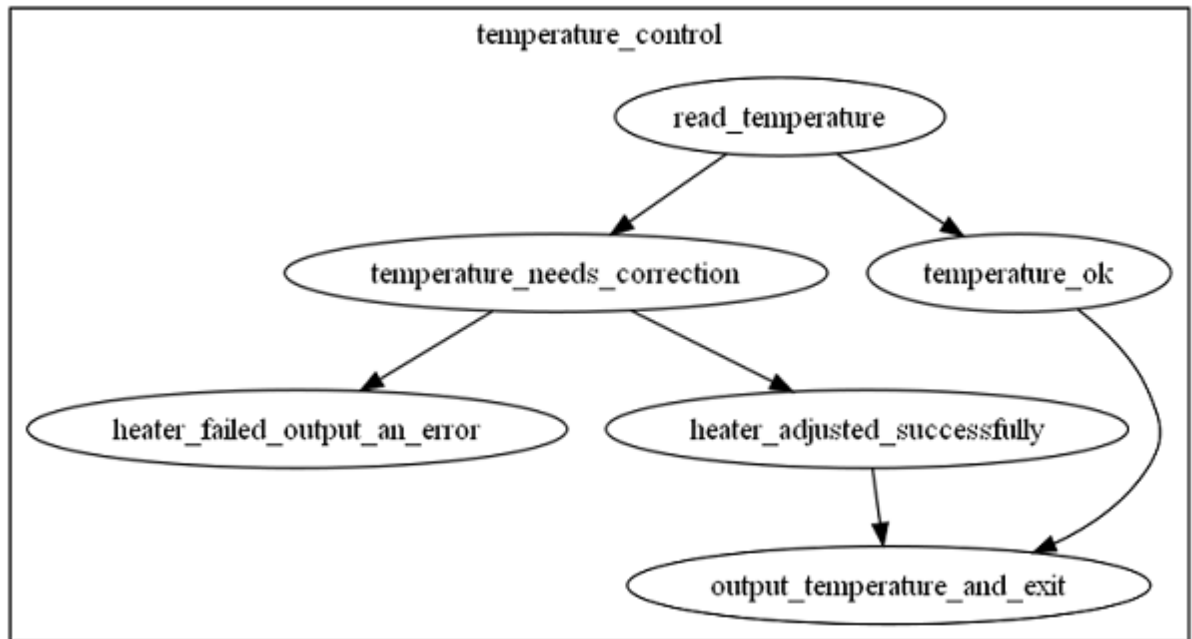


Fig. 4: Example of a simple supervised entity with a control flow

FAILED EXPIRED

- [WdgMFailedProgramFlowRefCycleTol](#) 
- [WdgMProgramFlowReferenceCycle](#) 

OK FAILED

FAILED OK

EXPIRED

FAILED

OK FAILED

OK EXPIRED DE5d(E)Tj 10 0 Td(5d(E)Tj 17TTj 1

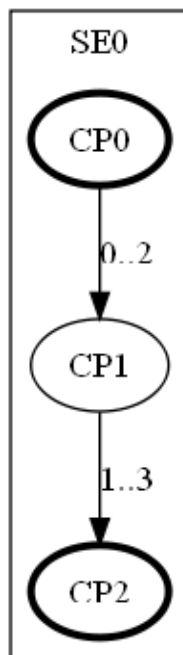


Fig. 5: Example of a simple supervised entity with deadlines

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- [WdgM_MainFunction\(\)](#) 

[WdgM_MainFunction\(\)](#) 

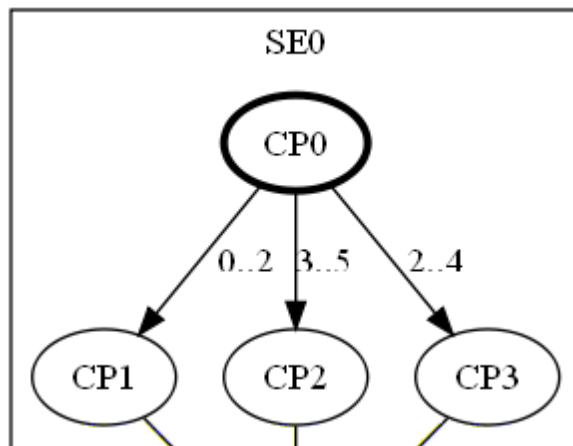


Fig. 6: Example of multiple outgoing transitions with deadlines

WdgM_MainFunction() 

WdgM_MainFunction() 

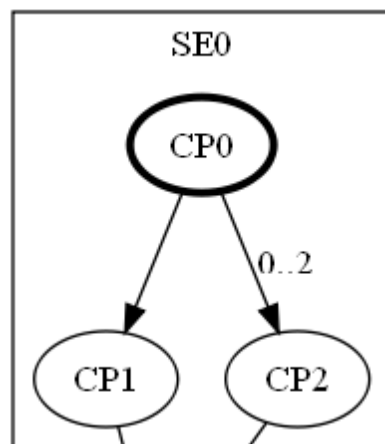


Fig. 7: Example of a the case where only one of several outgoing transitions has a deadline

FAILED EXPIRED

- WdgMFailedDeadlineRefCycleTol
- WdgMDeadlineReferenceCycle

OK FAILED

FAILED OK

EXPIRED

FAILED

		OK	FAILED
OK	EXPIRED	DEACTIVATED	

WdgM CheckPointReached()

WdgMFirstCycleAliveCounterReset 

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-
-
-

○ WdgMExpectedAliveIndications :

○ WdgMSupervisionReferenceCycle :

WdgMSupervisionCycle 

○ WdgMMinMargin :

○ WdgMMaxMargin :

○
`WdgMSupervisionReferenceCycle`
`[WdgMExpectedAliveIndications - WdgMMinMargin,`
`WdgMExpectedAliveIndications + WdgMMaxMargin]`

WdgMFirstCycleAliveCounterReset 

OK

FAILED

EXPIRED

DEACTIVATED

-
- `WdgMExpectedAliveIndications=1`
 - `WdgMSupervisionReferenceCycle=1`
 - `WdgMMinMargin=1`
 - `WdgMMaxMargin=0`

`WdgMExpectedAliveIndications`

- WdgMMinMargin)

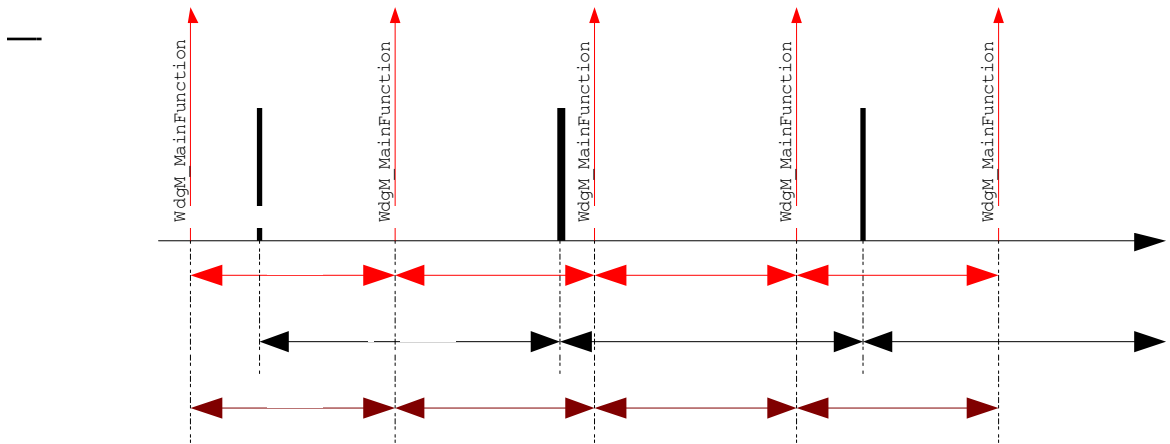


Fig. 8: A task being monitored during one S-WdgM supervision cycle (20ms)

- WdgMExpectedAliveIndications=2
- WdgMSupervisionReferenceCycle=2
- WdgMMinMargin=1
- WdgMaxMargin=0

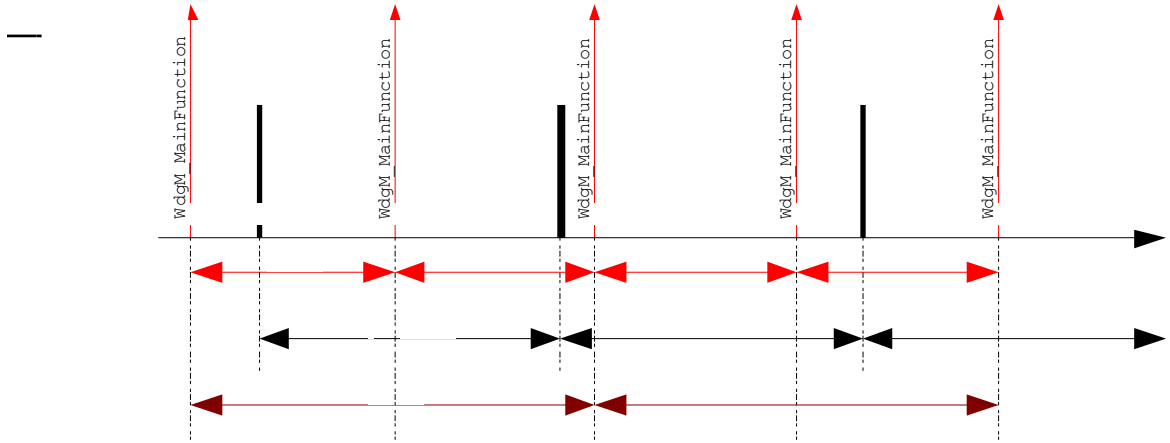


Fig. 9: A task being monitored during two S-WdgM supervision cycles (40ms)

`read_temperature`

only when
configured. The reflexive transitions cannot be defined for local initial or local end checkpoints.

[WdgMGlobalTransitionSourceRef](#) 
[WdgMGlobalTransitionDestRef](#) 

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- `pressure_sensor_task`

- `control_pressure_task` `pressure_sensor_task`
-
- `control_pressure_task`

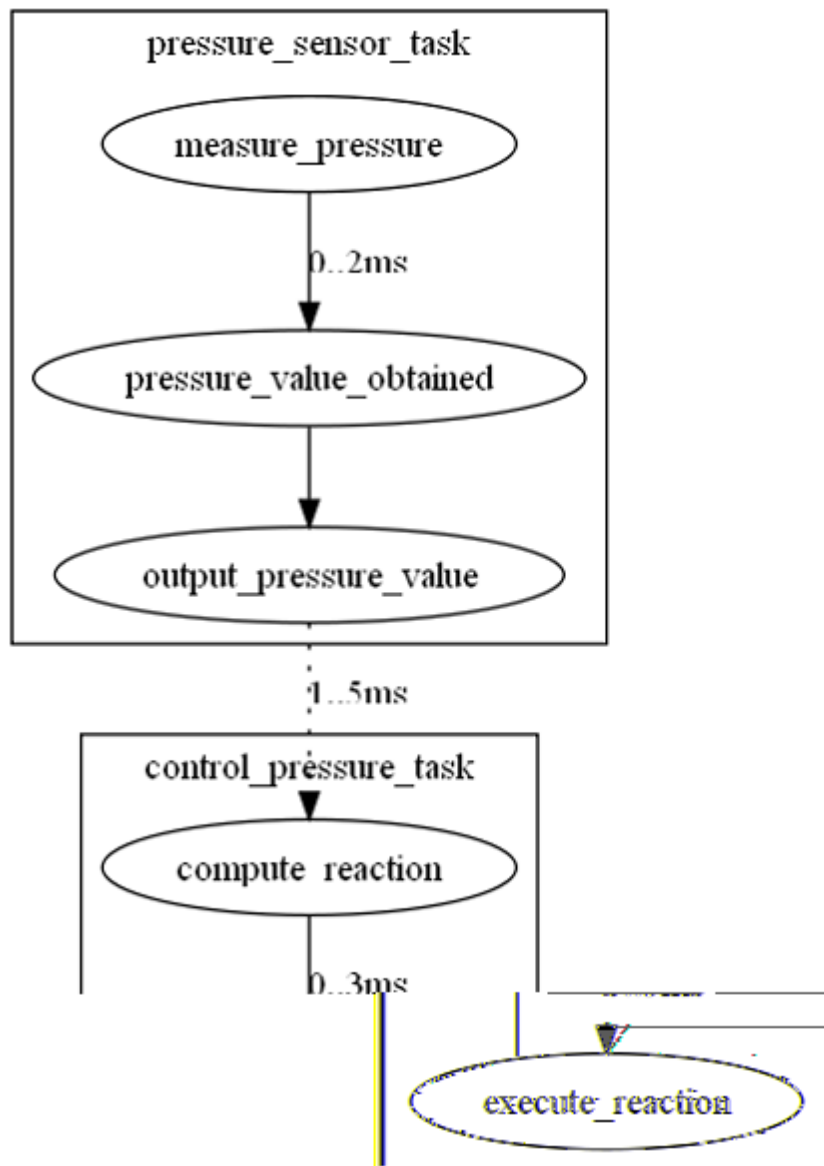


Fig. 10: Global transition between two supervised entities

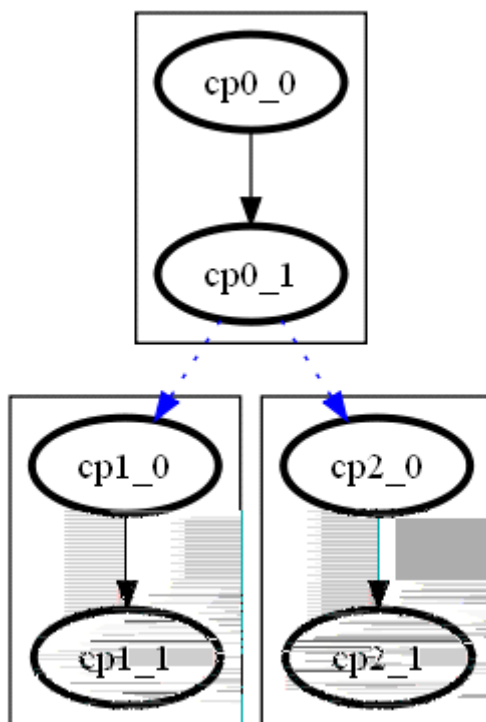


Fig. 11: Incorrect global transition split

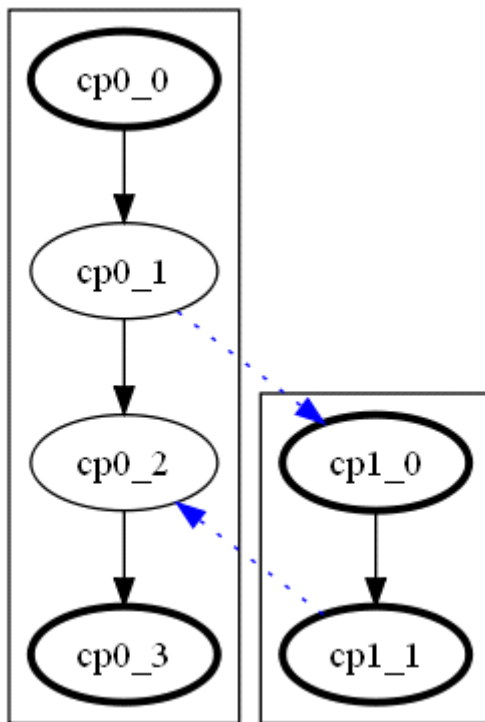


Fig. 12: Incorrect program split in the middle of an entity

true

WdgM_MainFunction() 

WdgM_MainFunction()

WdgMProgramFlowReferenceCycle  = 3
WdgM_MainFunction()

WdgMTriggerConditionValue  WdgMTriggerWindowStart 

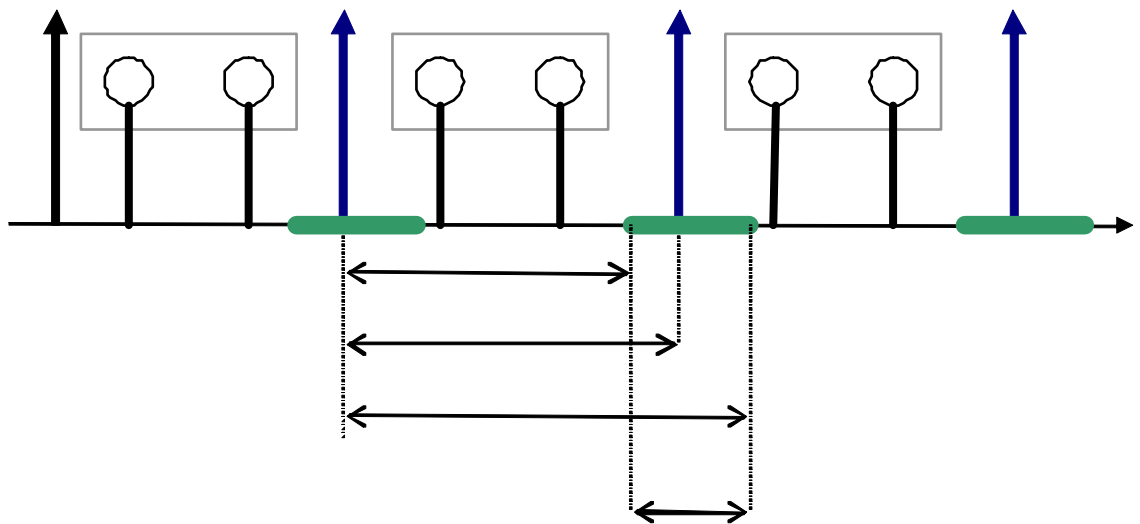


Fig. 13: S-WdgM supervision cycle

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WdgM MainFunction() 

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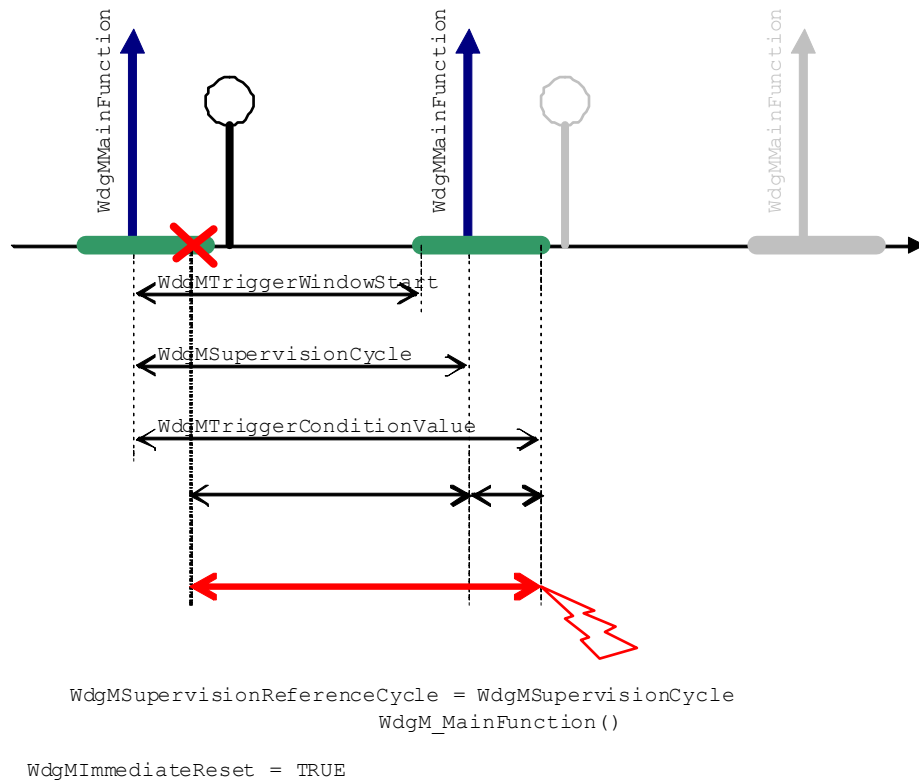


Fig. 14: The S-WdgM Stack minimum reaction time

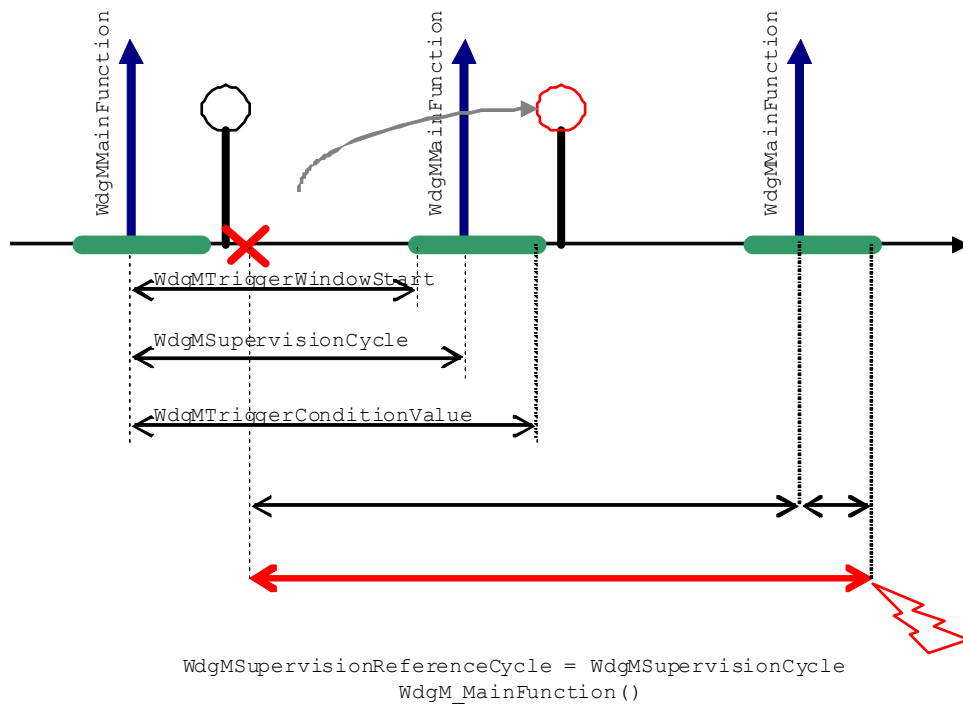


Fig. 15: The S-WdgM Stack maximum reaction time

WDGM_SECOND_RESET_PATH = STD_ON

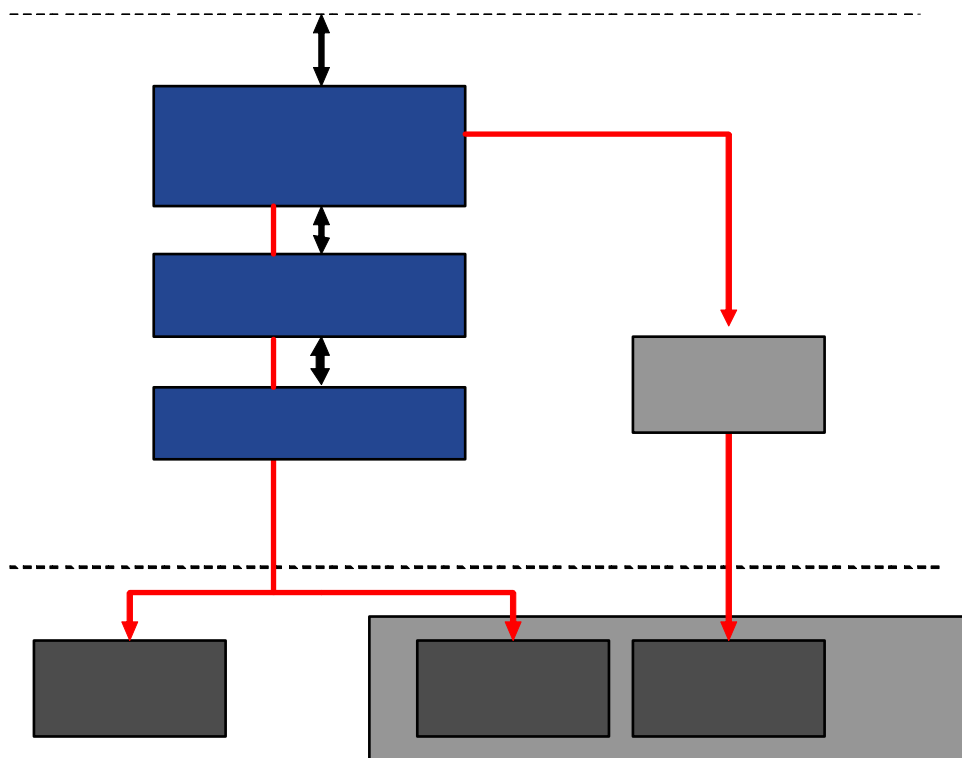


Fig. 16: Primary and secondary reset path of the S-WdgM

[Appl Mcu PerformReset\(\)](#) 

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WDGM IMMEDIATE RESET

OK

FAILED

EXPIRED

•

FAILED

OK

•

FAILED

•

OK

•

EXPIRED

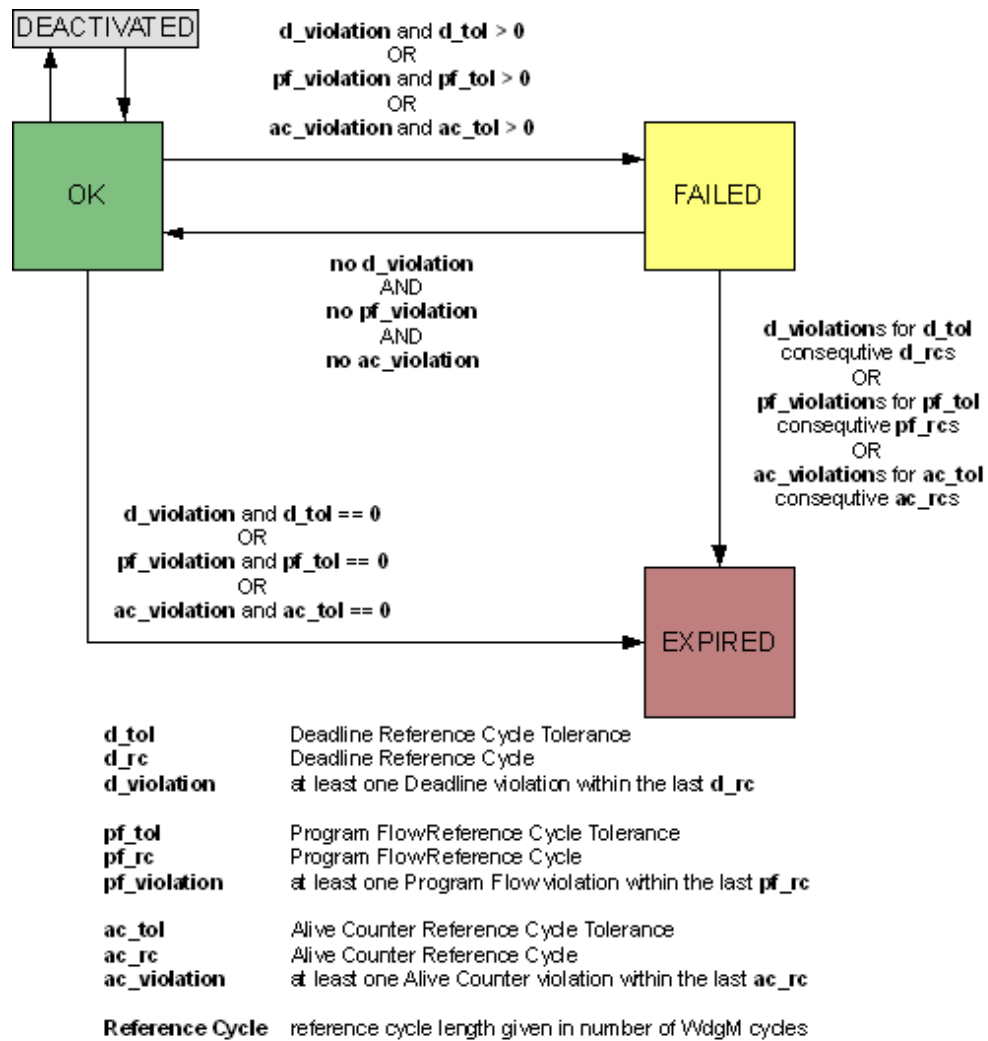
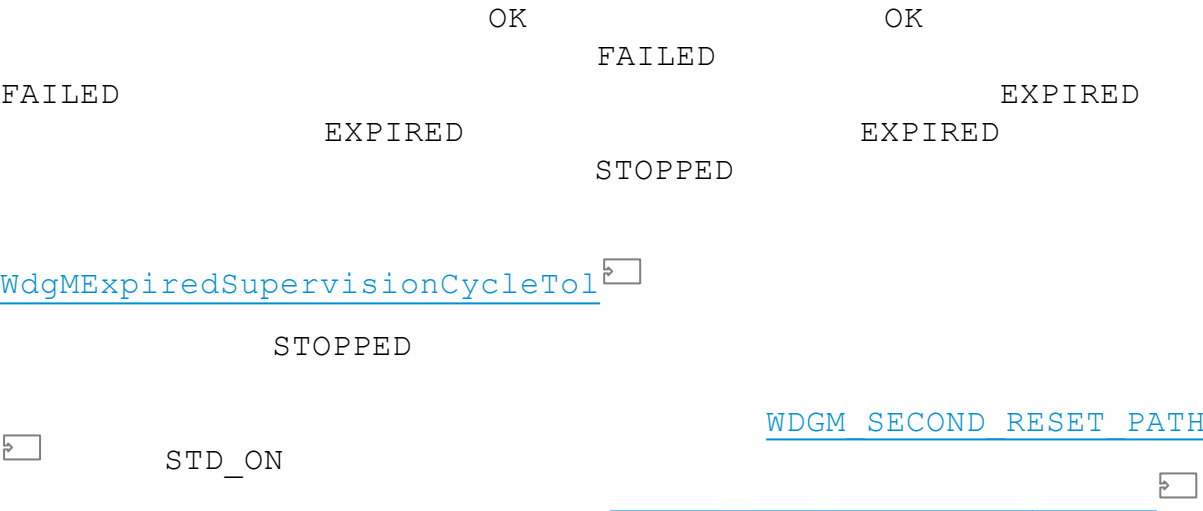


Fig. 17: Modified state machine

reference cycle = reference cycle tolerance = 0

	WdgMSupervisionReferenceCycle	WdgMFailedSupervisionRefCycleTol
	WdgMProgramFlowReferenceCycle	WdgMFailedProgramFlowRefCycleTol
	WdgMDeadlineReferenceCycle	WdgMFailedDeadlineRefCycleTol

- [WdgMProgramFlowReferenceCycle](#)
- [WdgMFailedProgramFlowRefCycleTol](#)
- [WdgMDeadlineReferenceCycle](#)
- [WdgMFailedDeadlineRefCycleTol](#)



WDGM_AUTOSAR_4_x (STD_ON / STD_OFF)
WdgM_Cfg_Features.h

xmlns

- WDGM_AUTOSAR_4_x STD_OFF

- WDGM_AUTOSAR_4_x STD_ON

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FALSE

FALSE

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WdgMTimebaseSource

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WdgMExpiredSupervisionCycleTol 
 (WdgMExpiredSupervisionCycleTol + 2)
 WdgMExpiredSupervisionCycleTol

-

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```
WDGM_IMMEDIATE_RESET = STD_ON
Appl_Mcu_PerformReset()
```

-

```
BswM_WdgM_RequestPartitionReset()
```

-

```
WdgM_SetMode()
```

- WdgMTriggerConditionValue 
- WdgMTriggerWindowStart 
- WdgMWatchdogMode .

- WdgM_DeInit()
 -  WdgM_DeactivateSupervisionEntity()
WdgM_ActivateSupervisionEntity() 
 -
 -
 -  WdgMDevErrorDetect
-  
-



	WdgMDevErrorDetect
	WDGM_DEV_ERROR_DETECT
	WdgM/WdgMGeneral/
	false/true
	true: false:

	WdgMDemReport
	WDGM_DEM_REPORT


	WdgM/WdgMGeneral/
	false/true
	true: false:



	WdgMImmediateReset
	WDGM_IMMEDIATE_RESET
	WdgM/WdgMGeneral/
	false/true
	WDGM_GLOBAL_STATUS_STOPPED

	true: false:
--	-----------------

	WdgMOffModeEnabled
	WDGM_OFF_MODE_ENABLED
	WdgM/WdgMGeneral/
	false/true
	WDGIF_MODE_OFF true: WDGIF_MODE_OFF false: WDGIF_MODE_OFF

	WdgMVersionInfoApi
	WDGM_VERSION_INFO_API
	WdgM/WdgMGeneral/

	false/true
	WdgM_GetVersionInfo()  WdgM_GetVersionInfo() true: false:

	WdgMDefensiveBehavior
	WDGM_DEFENSIVE_BEHAVIOR
	WdgM/WdgMGeneral/
	false/true
	<ul style="list-style-type: none"> ▪ WdgM_SetMode()  ▪ WdgM_MainFunction() 

	WdgMUseRte
	WDGM_USE_RTE
	WdgM/WdgMGeneral/
	false/true
	<div style="text-align: right;"> </div> true: false:



	WdgMDemSupervisionReport
	WDGM_DEM_SUPERVISION_REPORT
	WdgM/WdgMGeneral/
	false/true

	WdgMDemAliveSupervisionReport
	<div>WDGM_GLOBAL_STATE_STOPPED</div> <div>true:</div> <div>false:</div>

	WdgMUseOsSuspendInterrupt
	WDGM_USE_OS_SUSPEND_INTERRUPT
	WdgM/WdgMGeneral/
	false/true
	<div>true<div>WDGM_AUTOSAR_4_x is</div><div>STD_OFF</div><div>SchM_Enter_WdgM()</div><div>SchM_Exit_WdgM()</div><div>WDGM_AUTOSAR_4_x is</div><div>STD_ON</div><div>SchM_Enter_WdgM_WDGM_EXCLUSIVE_AREA_0()</div><div>SchM_Exit_WdgM_WDGM_EXCLUSIVE_AREA</div></div>

	<div>0 ()</div> <div>false:</div> <div>GlobalSuspendInterrupts ()</div> <div>GlobalRestoreInterrupts ()</div>
--	---------------------------------------------------------------------------------------------------------------

	WdgMTimebaseSource
	WDGM_TIMEBASE_SOURCE
	WdgM/WdgMGeneral/
	<div>▪ WDGM_EXTERNAL_TICK</div> <div>▪ WDGM_INTERNAL_SOFTWARE_TICK</div> <div>▪ WDGM_INTERNAL_HARDWARE_TICK</div>
	<div>▪</div> <div>▪</div> <div>WdgMTimebaseSource</div> <div>WdgMInternalSoftwareTick</div> <div>WdgMTicksPerSecond</div> <div>▪ WDGM_EXTERNAL_TICK:</div>

	<div data-bbox="655 264 1157 313"><u>WdgM_UpdateTickCount()</u> </div> <div data-bbox="632 409 1217 441"><ul style="list-style-type: none">▪ WDG_INTERNAL_SOFTWARE_TICK:</div> <div data-bbox="649 497 1077 548"><u>WdgM_MainFunction()</u> </div> <div data-bbox="632 568 1217 600"><ul style="list-style-type: none">▪ WDG_INTERNAL_HARDWARE_TICK:</div> <div data-bbox="802 714 1176 745"><p>WdgMTicksPerSecond</p></div>
--	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

	WdgMSecondResetPath
	WDGM_SECOND_RESET_PATH
	WdgM/WdgMGeneral/
	false/true
	<p>Appl_Mcu_PerformReset()</p> <p>Appl_Mcu_PerformReset()</p> <p>Mcu_PerformReset()</p> <p>true Appl_Mcu_PerformReset()</p>

	false
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	WdgMTickOverrunCorrection
	WDGM_TICK_OVERRUN_CORRECTION
	WdgM/WdgMGeneral/
	false/true
	<ul style="list-style-type: none"> ▪ true: ▪ false: <p>WdgMTimebaseSource </p> <p>WDGM_EXTERNAL_TICK WDGM_TIMEBASE_SOURCE =</p> <p>true</p> <p>true</p>

	WdgMEntityDeactivationEnabled
	WDGM_ENTITY_DEACTIVATION_ENABLED
	WdgM/WdgMGeneral/
	false/true
	<div style="text-align: right;"> </div> <p> WdgM_DeactivateSupervisionEntity() WdgM_ActivateSupervisionEntity() </p> <p> WdgMEnableEntityDeactivation </p> <ul style="list-style-type: none"> ▪ true: ▪ false: <p style="text-align: center;">false</p>


	WdgMStateChangeNotification
	WDGM_STATE_CHANGE_NOTIFICATION
	WdgM/WdgMGeneral/

	false/true
	<pre>true: false: <u>WdgMGlobalStateChangeCb</u> <u>WdgMLocalStateChangeCb</u></pre>

	WdgMCallerId
	WdgM/WdgMGeneral/WdgMCallerIds/
	0...65535
	WdgM_SetMode()

	WdgMFirstCycleAliveCounterReset

	false/true
	<ul style="list-style-type: none"> ▪ true ▪ false

	WdgMGlobalStateChangeCbK
	WdgM/WdgMGeneral/
	

	WdgMGlobalMemoryAppTaskRef
	WdgM/WdgMConfigSet/WdgMMode/
	0, 1

	<p>MemMap</p> <p>WdgM_MemMap.h</p> <p>WdgM_OSMemMap.h</p>
--	-----------------------------------------------------------

	WdgMModeId
	WdgM/WdgMConfigSet/WdgMMode/
	0...255

	WdgMInitialTriggerModeId
	WdgM/WdgMConfigSet/WdgMMode/
	0...255

	<ul style="list-style-type: none"> ▪ WdgMTriggerConditionValue ▪ WdgMTriggerWindowStart ▪ WdgMWatchdogMode <p style="text-align: right;">WdgM_SetMode()</p>

	WdgMTriggerModeId
	WdgM/WdgMConfigSet/WdgMMode/WdgMTrigger/
	0...254

	WdgMTicksPerSecond
	WdgM/WdgMConfigSet/WdgMMode/
	Hz

	<pre> WdgM_UpdateTickCount() WdgMTimebaseSource • WDGM_INTERNAL_SOFTWARE_TICK (1 / WdgMTicksPerSecond [Hz]) = WdgMSupervisionCycle [s] • WDGM_INTERNAL_HARDWARE_TICK WDGM_EXTERNAL_TICK (1 / WdgMTicksPerSecond [Hz]) <= WdgMSupervisionCycle [s] • WdgMTicksPerSecond </pre>

	WdgMSupervisionCycle
	WdgM/WdgMConfigSet/WdgMMode/
	0 < WdgMSupervisionCycle
	second

	<p>WdgM_MainFunction()</p> <p>WdgM_MainFunction()</p>
--	-------------------------------------------------------

	WdgMExpiredSupervisionCycleTol
	WdgM/WdgMConfigSet/WdgMMode/
	0...65535
	WDGM_LOCAL_STATUS_EXPIRED

	WdgMGlobalCheckpointFinalRef
	WdgM/WdgMConfigSet/WdgMMode/ WdgMProgramFlowSupervision/
	0...65535

--	--

	WdgMGlobalCheckpointInitialRef
	WdgM/WdgMConfigSet/WdgMMode/ WdgMProgramFlowSupervision/
	0, 1

	WdgMWatchdogName
	WdgM/WdgMGeneral/WdgMWatchdog/

	WdgIfDeviceRef
	WdgM/WdgMGeneral/WdgMWatchdog/
	1
	WdgIfDevice

	WdgMWatchdogMode
	WdgM/WdgMConfigSet/WdgMMode/WdgMTrigger/
	<ul style="list-style-type: none"> ▪ WDGIF_FAST_MODE ▪ WDGIF_OFF_MODE ▪ WDGIF_SLOW_MODE
	WdgIf_ModeType

--	--

	WdgMTriggerWatchdogRef
	WdgM/WdgMConfigSet/WdgMMode/WdgMTrigger/
	0...255

	WdgMFailedSupervisionRefCycleTol
	WdgM/WdgMConfigSet/WdgMMode/WdgMLocalStatusParams/
	0...65534

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	WdgMSupervisedEntityInitialMode
	WdgM/WdgMConfigSet/WdgMMode/WdgMLocalStatusParams/
	<ul style="list-style-type: none"> ▪ WDGM_LOCAL_STATUS_DEACTIVATED, ▪ WDGM_LOCAL_STATUS_OK, ▪ WDGM_LOCAL_STATUS_FAILED

	WdgMFailedDeadlineRefCycleTol
	WdgM/WdgMConfigSet/WdgMMode/WdgMLocalStatusParams/
	0...65534
	WdgMDeadlineReferenceCycle

	WdgMDeadlineReferenceCycle
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	WdgMDeadlineReferenceCycle
	WdgM/WdgMConfigSet/WdgMMode/WdgMLocalStatusParams/
	0...65535
	<p>WdgMFailedDeadlineRefCycleTol</p> <p>EXPIRED</p>

	WdgMFailedProgramFlowRefCycleTol
	WdgM/WdgMConfigSet/WdgMMode/WdgMLocalStatusParams/
	0...65534





	<div>WdgMProgramFlowReferenceCycle</div> <div>WdgMProgramFlowReferenceCycle</div>

	WdgMProgramFlowReferenceCycle
	WdgM/WdgMConfigSet/WdgMMode/WdgMLocalStatusParams/
	0...65535
	<div>WdgMFailedProgramFlowRefCycleTol</div> <div>EXPIRED</div>

	WdgMLocalStatusSupervisedEntityRef
	WdgM/WdgMConfigSet/WdgMMode/WdgMLocalStatusParams/
	1

	WdgMSupervisedEntityId
	WdgM/WdgMGeneral/WdgMSupervisedEntity/
	0...65534

	WdgMEnableEntityDeactivation
	WdgM/WdgMGeneral/WdgMSupervisedEntity/

	false/true
	<p>WdgMEntityDeactivationEnabled </p> <p></p> <p>WdgM_DeactivateSupervisionEntity() WdgM_ActivateSupervisionEntity()</p> <ul style="list-style-type: none"> ▪ true: <p>WdgM_ActivateSupervisionEntity() </p> <p>WdgM_DeactivateSupervisionEntity() </p> <ul style="list-style-type: none"> ▪ false:

	WdgMSupportedAutosarAPI
	WdgM/WdgMGeneral/WdgMSupervisedEntity/
	API_4_0 API_3_1
	<ul style="list-style-type: none"> ▪ API_4_0

	<div>▪ API_3_1</div> <div></div>
--	----------------------------------

	WdgMLocalStateChangeCbk
	WdgM/WdgMGeneral/WdgMSupervisedEntity/
	0, 1

	WdgMLocalCheckpointFinalRef
	WdgM/WdgMGeneral/WdgMSupervisedEntity/
	0...65535

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	WdgMLocalCheckpointInitialRef
	WdgM/WdgMGeneral/WdgMSupervisedEntity/
	1

	WdgMAppTaskRef
	WdgM/WdgMGeneral/WdgMSupervisedEntity/
	0, 1
	<div><div></div><div></div></div>

	WdgMCheckpointId
	WdgM/WdgMGeneral/WdgMSupervisedEntity/ WdgMCheckpoint/
	0...65534

	WdgMExpectedAliveIndications
	WdgM/WdgMConfigSet/WdgMMode/WdgMAliveSupervision/
	0...65535

	WdgMMaxMargin
	WdgM/WdgMConfigSet/WdgMMode/WdgMAliveSupervision/
	0...65535
	WdgMExpectedAliveIndications

	WdgMMinMargin
	WdgM/WdgMConfigSet/WdgMMode/WdgMAliveSupervision/
	0...65535
	WdgMExpectedAliveIndications

	WdgMSupervisionReferenceCycle
	WdgM/WdgMConfigSet/WdgMMode/WdgMAliveSupervision/

	1...65535
	WdgMSupervisionCycle

	WdgMAliveSupervisionCheckpointRef
	WdgM/WdgMConfigSet/WdgMMode/WdgMAliveSupervision/
	1

	WdgMLocalTransitionDestRef
	WdgM/WdgMGeneral/WdgMSupervisedEntity/ WdgMLocalTransition/
	1

	WdgMLocalTransitionSourceRef
	WdgM/WdgMGeneral/WdgMSupervisedEntity/ WdgMLocalTransition/
	1

	WdgMGlobalTransitionDestRef
	WdgM/WdgMConfigSet/WdgMMode/ WdgMProgramFlowSupervision /WdgMGlobalTransition/
	1

	WdgMGlobalTransitionSourceRef
	WdgM/WdgMConfigSet/WdgMMode/ WdgMProgramFlowSupervision /WdgMGlobalTransition/
	1

	WdgMDeadlineMax
	WdgM/WdgMConfigSet/WdgMMode/WdgMDeadlineSupervision/
	$0.0 \dots ((1/\text{WdgMTicksPerSecond}) * 65535)$

	WdgMDeadlineMin
	WdgM/WdgMConfigSet/WdgMMode/WdgMDeadlineSupervision/

	$0.0 \dots ((1/\text{WdgMTicksPerSecond}) * 65535)$

	WdgMDeadlineStartRef
	WdgM/WdgMConfigSet/WdgMMode/WdgMDeadlineSupervision/
	1

	WdgMDeadlineStopRef
	WdgM/WdgMConfigSet/WdgMMode/WdgMDeadlineSupervision/

	1

- WdgMTrigger WdgMWatchdog
WdgMTriggerWatchdogRef
WdgMWatchdog
- SHORT-NAME
WdgMTrigger WdgMTriggerWatchdogRef
WdgMWatchdog SHORT-NAME
WdgMWatchdogName
-
- WdgMMode
WdgMProgramFlowSupervision
WdgMGlobalCheckpointInitialRef
- WdgMSupervisedEntityId
SupervisedEntity

WdgMSupervisedEntity
- "http://autosar.org/3.1.4"

	WdgM_ConfigType
	Structure
	<div><div></div><div></div></div>

	WdgM_SupervisedEntityIdType
	uint16
	0...65534
	<div>STD_ONWDGM_USE_RTE</div>

	WdgM_CheckpointIdType
	uint16
	0...65534
	<div>STD_ON</div> <div>WDGM_USE_RTE</div>


	WdgM_ModeType
	uint8
	0...255
	<div>WdgM_GetMode()</div> <div>WDGM_USE_RTE</div> <div>STD_ON</div>

	WdgM_LocalStatusType
	uint8
	<ul style="list-style-type: none"> WDGM_LOCAL_STATUS_OK = 0 WDGM_LOCAL_STATUS_FAILED = 1 WDGM_LOCAL_STATUS_EXPIRED = 2 WDGM_LOCAL_STATUS_DEACTIVATED = 4
	WdgM_GetLocalStatus()

	<div>STD_ON</div> <div>WDGM_USE_RTE</div>
--	-------------------------------------------

	WdgM_GlobalStatusType
	uint8
	<ul style="list-style-type: none"> WDGM_GLOBAL_STATUS_OK = 0, WDGM_GLOBAL_STATUS_FAILED = 1, WDGM_GLOBAL_STATUS_EXPIRED = 2, WDGM_GLOBAL_STATUS_STOPPED = 3, WDGM_GLOBAL_STATUS_DEACTIVATED = 4
	<div>WdgM_GetGlobalStatus()</div> <div>WDGM_USE_RTE</div> <div>STD_ON</div>

	WdgM_TimeBaseTickType
	uint32
	$0 \dots 2^{32-1}$

	Std_VersionInfoType
	WdgM_GetVersionInfo() 

	Std_ReturnType WdgM_SetMode (WdgM_ModeType Mode, uint16 CallerID)
	0x03
	Mode CallerID: WdgM_SetMode() WdgMDefensiveBehavior
	Std_ReturnType: E_OK: E_NOT_OK:

	<div>Mode</div> <div><div>▪ WdgMTriggerConditionValue</div><div>▪ WdgMTriggerWindowStart</div><div>▪ WdgMWatchdogMode</div></div> <div><div>ID Mode</div><div>ID Mode</div></div>
--	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

	<div>Std_ReturnType WdgM_GetMode (WdgM_ModeType* Mode)</div>
	0x0b
	Mode:
	<div>Std_ReturnType:</div> <div><div>▪ E_OK:</div><div>▪ E_NOT_OK:</div></div>

--	--

	Std_ReturnType WdgM_CheckpointReached (WdgM_SupervisedEntityType SEID, WdgM_CheckpointIdType CheckpointID)
	0x0e
	<ul style="list-style-type: none"> ▪ SEID: ▪ CheckpointID:
	Std_ReturnType: <ul style="list-style-type: none"> ▪ E_OK: ▪ E_NOT_OK <ul style="list-style-type: none"> ○ WDGM_E_NO_INIT 0x10 ○ WDGM_E_PARAM_SEID 0x13 ○ WDGM_E_CPID 0x16 ○ WDGM_E_PARAM_STATE 0x29

--	--

	Std_ReturnType WdgM_GetLocalStatus (WdgM_SupervisedEntityIdType SEID, WdgM_LocalStatusType* Status)
	0x0c
	SEID:
	Status:
	Std_ReturnType: ▪ E_OK: ▪ E_NOT_OK:
	WdgM_MainFunction()

	Std_ReturnType WdgM_GetGlobalStatus (WdgM_GlobalStatusType* Status)
	0x0d

	Status:
	Std_ReturnType: <ul style="list-style-type: none"> ▪ E_OK: ▪ E_NOT_OK:
	WdgM_MainFunction()

	Std_ReturnType WdgM_PerformReset(void)
	0x0f
	Std_ReturnType:
	<ul style="list-style-type: none"> ▪ E_OK:

	▪ E_NOT_OK:
	<ul style="list-style-type: none"> ▪ ▪ <p>WdgM_PerformReset()</p>

	Std_ReturnType WdgM_DeactivateSupervisionEntity (WdgM_SupervisedEntityIdType SEID)
	SEID: [0...N]
	Std_ReturnType: <ul style="list-style-type: none"> ▪ E_OK: ▪ E_NOT_OK:
	<p>WDGM_LOCAL_STATUS_OK</p> <p>WDGM_LOCAL_STATUS_FAILED</p>

	<div>WdgM_MainFunction()</div> <div>WDGM_LOCAL_STATUS_DEACTIVATED</div> <div><div>▪</div><div>▪</div><div>▪</div><div>WdgM_DeactivateSupervisionEntity()</div><div>▪</div><div>WdgM_MainFunction()</div><div>▪</div><div>WdgM_GetLocalStatus ()</div><div>▪</div><div>WdgMEntityDeactivationEnabled true</div><div><div><div>WdgMEnableEntityDeactivation</div><div>true</div></div></div></div>
--	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

	Std_ReturnType WdgM_ActivateSupervisionEntity (WdgM_SupervisedEntityIdType SEID)
	SEID:
	Std_ReturnType

	<div><div>▪ E_OK:</div><div>▪ E_NOT_OK:</div></div>
	<div><div>WDGM_LOCAL_STATUS_DEACTIVATED</div><div>WdgM_MainFunction()</div><div>▪</div><div>▪ WdgM_MainFunction()</div><div>▪ WdgM_GetLocalStatus()</div><div>▪</div><div>WdgMEntityDeactivationEnabled true</div><div>WdgMEnableEntityDeactivation true</div></div>

WDGM_STATE_CHANGE_NOTIFICATION == STD_ON

[WdgMGlobalStateChangeCbk](#)

WDGM_STATE_CHANGE_NOTIFICATION == STD_ON

[WdgMLocalStateChangeCbk](#)

	void WdgM_Init(const WdgM_ConfigType* ConfigPtr)
	0x00
	ConfigPtr:
	WdgM_Init() ConfigPtr

	<code>void WdgM_GetVersionInfo (Std_VersionInfoType* VersionInfo)</code>
	<code>0x02</code>
	<code>VersionInfo:</code>
	<code>WdgM_GetVersionInfo()</code>

	<code>void WdgM_MainFunction(void)</code>
	<code>0x08</code>
	<code>FIXED_CYCLIC</code>

	<ul style="list-style-type: none">▪▪▪▪▪ <p>WdgM_MainFunction()</p> <ul style="list-style-type: none">▪▪▪▪▪

	void WdgM_UpdateTickCount(void)
	FIXED_CYCLIC
	WdgMTimebaseSource  WDGM_EXTERNAL_TICK

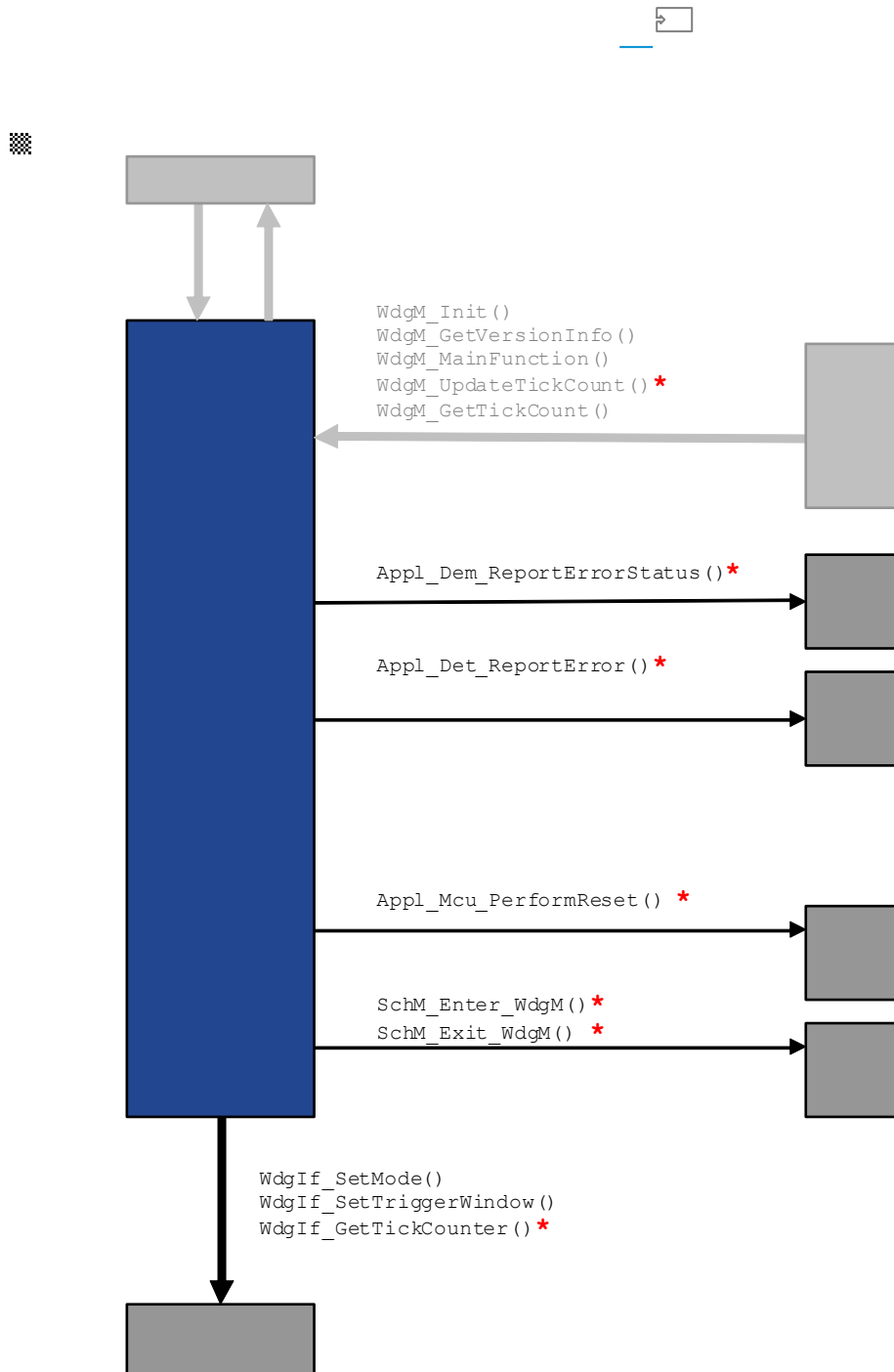


Fig. 18: Expected interfaces to external modules

<div>Appl_Dem_ReportErrorStatus()</div>	<div>WdgMDemReport</div> <div>STD_ON</div> <div>Dem_ReportErrorStatus()</div> <div>Appl_Dem_ReportErrorStatus()</div> <div><div></div></div>
<div>Appl_Det_ReportError()</div>	<div>WdgMDevErrorDetect</div> <div>STD_ON</div> <div>Det_ReportError()</div> <div>Appl_Det_ReportError()</div> <div><div></div></div>
<div>Appl_Mcu_PerformReset()</div>	<div>WDGM_SECOND_RESET_PATH</div> <div>STD_ON</div> <div>Mcu_PerformReset()</div> <div>Appl_Mcu_PerformReset()</div> <div><div></div></div>
<div>SchM_Enter_WdgM()</div> <div>SchM_Exit_WdgM()</div>	<div>WdgMUseOsSuspendInterrupt</div> <div>STD_ON</div> <div>SchM_Enter_WdgM()</div> <div>SchM_Exit_WdgM()</div> <div><div></div></div>

- WdgMDevErrorDetect,
 - WdgMDemReport,
 - WdgMUseOsSuspendInterrupt,
 - WdgMImmediateReset and
 - WDGM_SECOND_RESET_PATH
- false

Appl_...()

WdgMSupportedAutosarAPI

API_3_1

-
-
-
-
-

WdgMSupportedAutosarAPI

API_3_1

WDGM_AUTOSAR_3_1_X_COMPATIBILITY = STD_ON

	WdgM_SetMode (Mode)
	WdgM_SetMode (Mode, CallerID)
	CallerID = 0

	WdgM_GetMode (*Mode)
	WdgM_GetMode (*Mode)

	WdgM_UpdateAliveCounter (SEID)
	WdgM_CheckpointReached (SEID, CPID)
	CPID = 0

	WdgM_GetAliveSupervisionStatus (SEID, *status)
	WdgM_GetLocalStatus (SEID, *status)
	WdgM_swc.arxml

	WdgM_GetGlobalStatus (*status)
	WdgM_GetGlobalStatus (*status)

	WdgM_ActivateAliveSupervision (SEID)
	WdgM_ActivateSupervisionEntity (SEID)
	WdgM_swc.arxml

	WdgM_DeactivateAliveSupervision (SEID)
	WdgM_DeactivateSupervisionEntity (SEID)
	WdgM_swc.arxml


	WdgM_GssChangeCbk (status)
	WdgM_GlobalStateChangeCbk (status)
	WdgM_swc.arxml

	WdgM_IssChangeCbk (status)
	WdgM_LocalStateChangeCbk (status)
	WdgM_swc.arxml

	WdgM_Init (&Config)
	WdgM_Init (&Config)

	WdgM_GetVersionInfo (&versioninfo)
	WdgM_GetVersionInfo (&versioninfo)

	WdgM_Cbk_GptNotification()
	WdgM_UpdateTickCount()
	WdgM_UpdateTickCount()

	WdgM_MainFunction_AliveSupervision()
	WdgM_MainFunction()
	<div></div> <div>WdgM_MainFunction()</div>

WdgM_MainFunction()

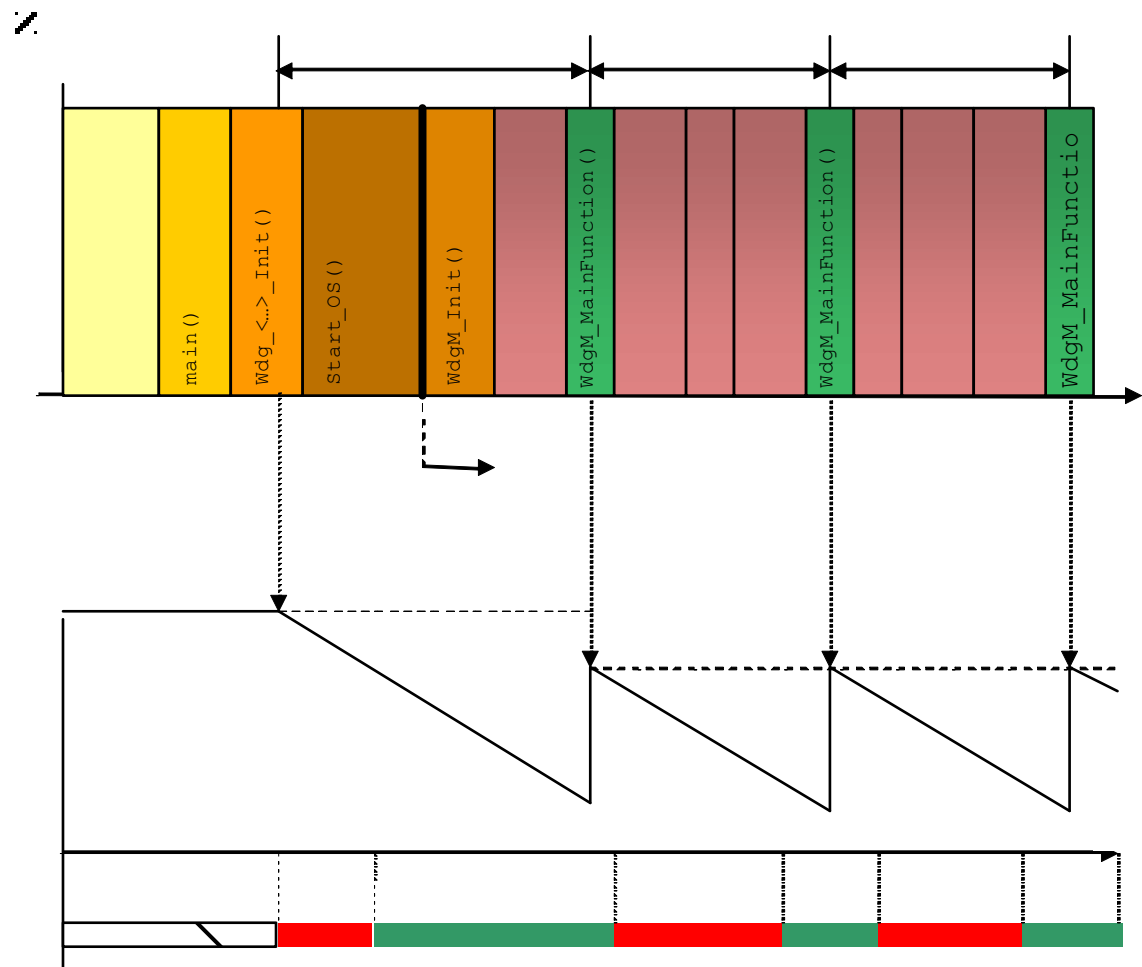


Fig. 19: Start phase of the S-WdgM

-

-

- WDGM_FIRSTCYCLE_ALIVECOUNTER_RESET 

-

- WdgM_Init()  WdgM_MainFunction() 

-

- Wdg_<...>_Init() main()

WdgM_Init()

WdgM_CheckpointReached()

WdgM_CheckpointReached()

WdgM_Init()

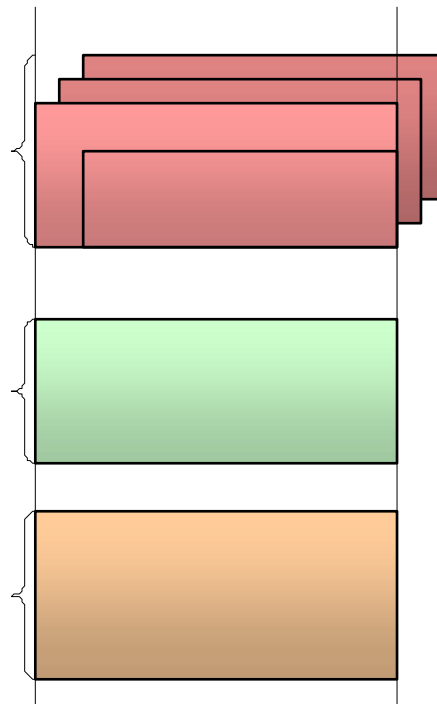


Fig. 20: Memory usage of the S-WdgM

```

WdgM_CheckpointReached()
WdgM_MemMap.h
WdgM_OSMemMap.h
WdgM_MemMap.h
WdgMAppTaskRef
START_SEC_VAR_*
STOP_SEC_VAR_*
Os_MemMap.h
WdgM_MemMap.h

```



```

_____
                                WdGM_GLOBAL_START_SEC_VAR_*
WdGM_GLOBAL_STOP_SEC_VAR_*

                                WdgMGlobalMemoryAppTaskRef
appl_name_START_SEC_VAR_*    appl_name_STOP_SEC_VAR_*
    appl_name
                                Os_MemMap.h                WdgM_MemMap.h
MemMap.h

```

```

_____

                                WdGM_GLOBAL_SHARED_START_SEC_VAR_*
WdGM_GLOBAL_SHARED_STOP_SEC_VAR_*

```

- [WdgM_MainFunction\(\)](#)

-

- [WdgM_MainFunction\(\)](#)

-

-

-

-

- [WdgM_MainFunction\(\)](#)

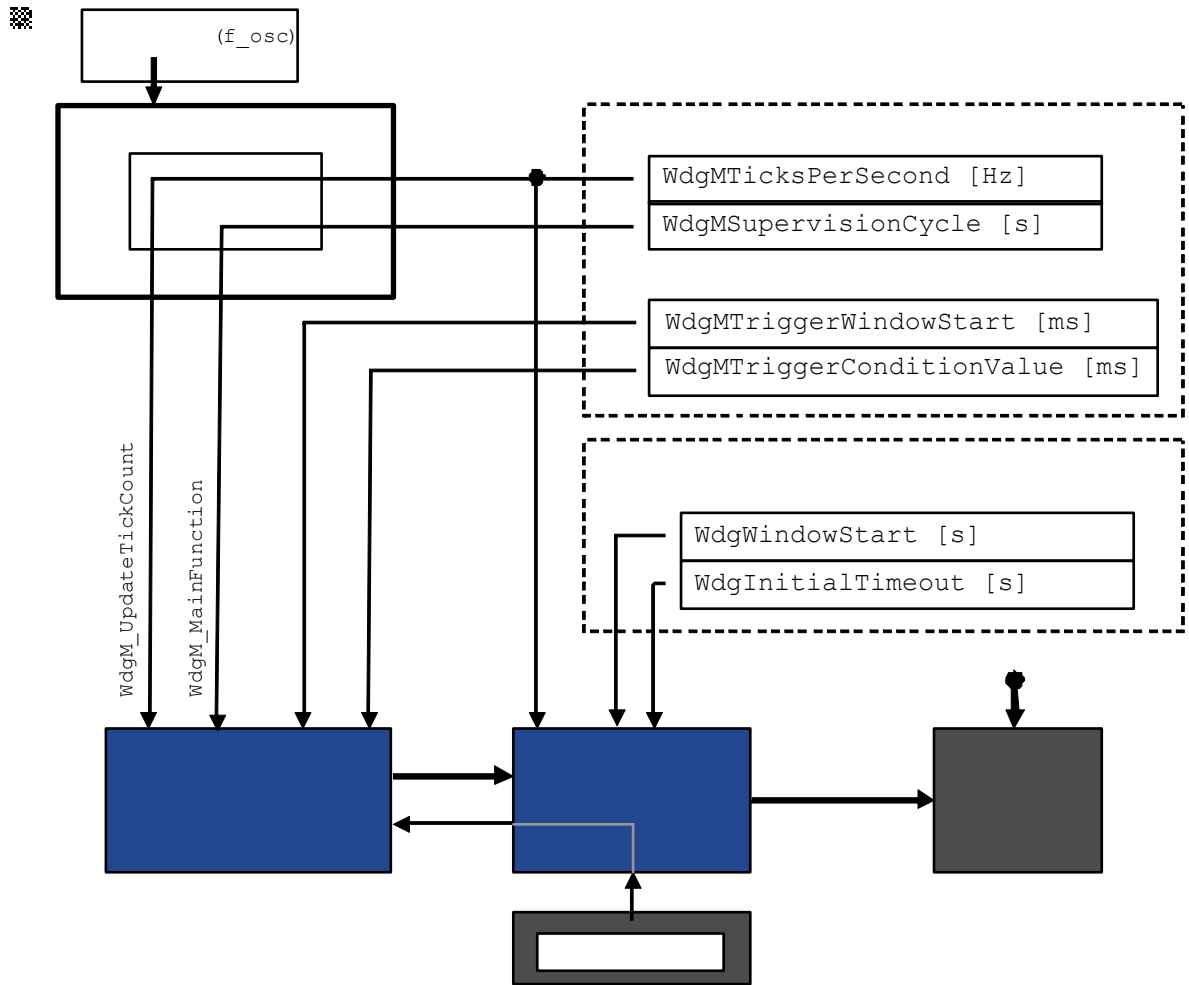


Fig. 21: Time base of the S-WdgM

- [WdgM_MainFunction\(\)](#)
- WdgM_UpdateTickCounter()

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WdgMSupervisionCycle

[WdgM_MainFunction\(\)](#)

WdgM_MainFunction()
WdgM_MainFunction()

WdgMTicksPerSecond	<ul style="list-style-type: none">•• WdgM_UpdateTickCount()• WdgMTicksPerSecond
--------------------	-------------------------------------------------------------------------------------------------------------------------------------------------

WdgMTriggerWindowStart

WdgMTriggerConditionValue	
---------------------------	--

WdgWindowStart

WdgInitialTimeout	
-------------------	--

- WdgMTicksPerSecond
- (WdgM_MainFunction())

WdgM_MainFunction()
- WdgM_UpdateTickCount()

WdgMTimebaseSource
WDGM_INTERNAL_SOFTWARE_TICK

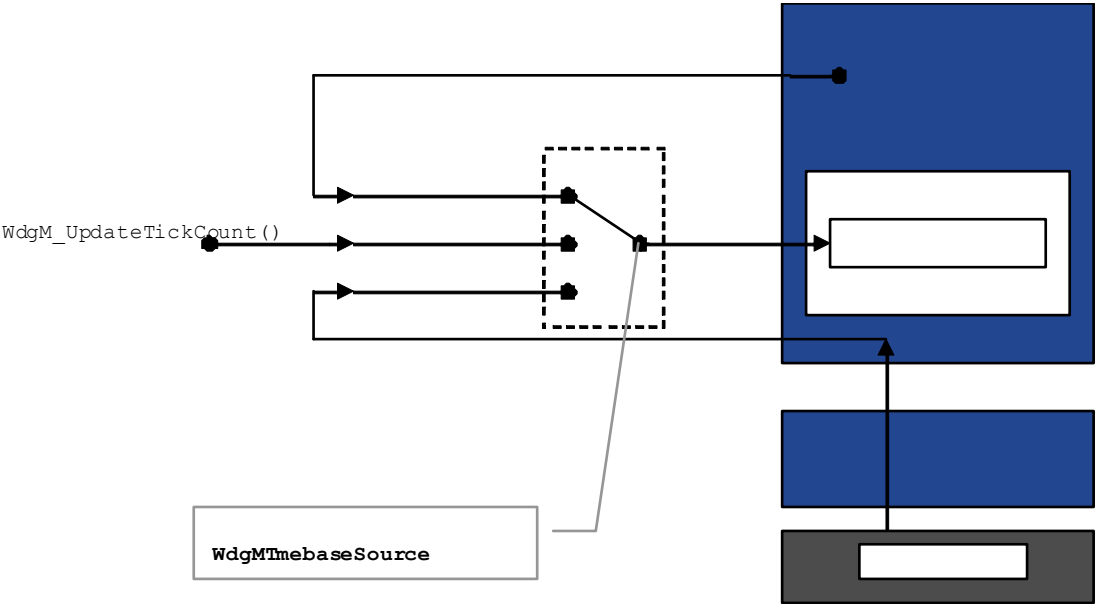


Fig. 22: S-WdgM Tick source selection for deadline monitoring

•

•

1

•

•

1000

0.002s=2ms

0.0005s=0.5ms

WdgMTicksPerSecond

WdgM_UpdateTickCount

()

Wdg_Mgr_Cfg_Gen.exe

*.arxml



Wdg_Mgr_Cfg_Gen.exe [options] <ECU-DESC-FILE> <OUTPUT-DIR>

[options]

--version

-h/--help

<ECU-DESC-FILE>

*.arxml

<OUTPUT-DIR>

- OLEAUT32.dll
 - USER32.dll
 - POWRPROF.dll
 - SHELL32.dll
-

- ole32.dll
- WSOCK32.dll
- ADVAPI32.dll
- WS2_32.dll
- VERSION.dll
- KERNEL32.dll

wdgm_verifier.dll

Verifier.exe
verifier_report.txt

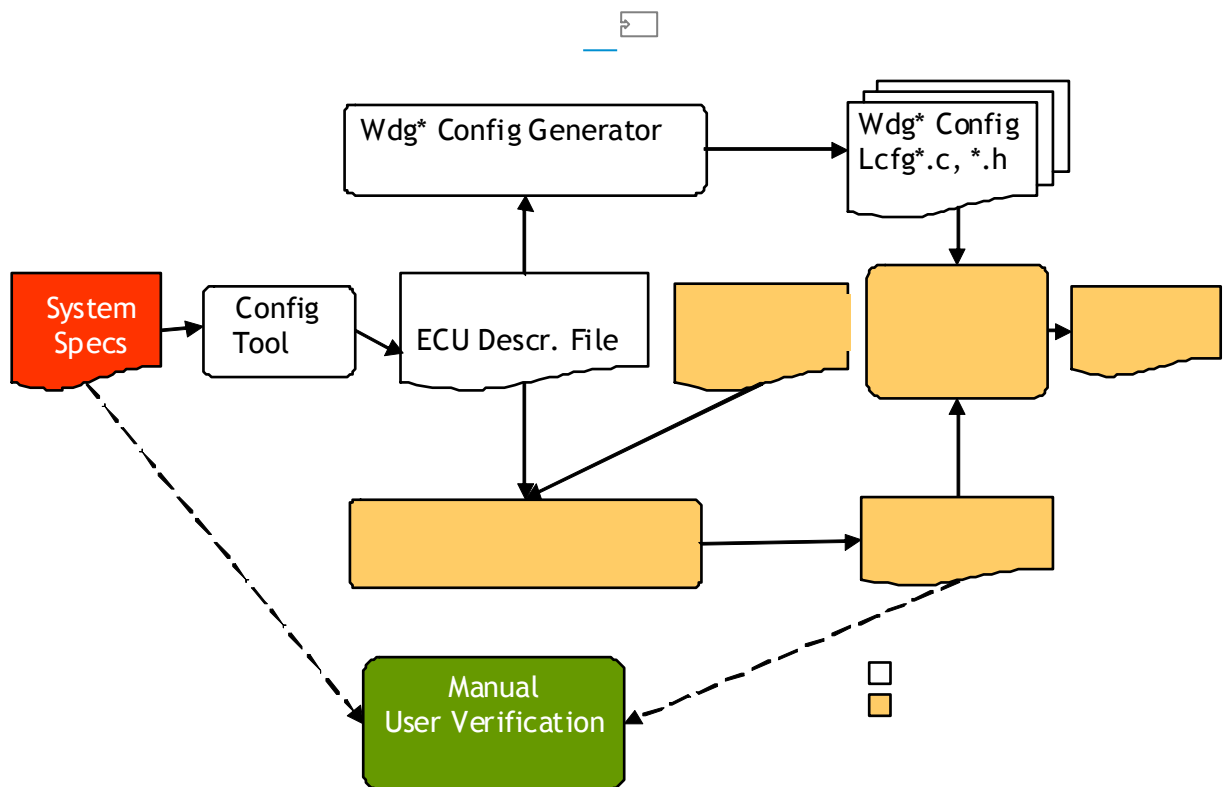


Fig. 23: Workflow of the S-WdgM Configuration Verifier build

- iconv.dll,
- libexslt.dll,
- libxml2.dll,
- libxslt.dll,
- zlib1.dll,
- xsltproc.exe.

MinGW-5.1.6.exe

```
c:\MinGW\bin
set PATH=%PATH%;c:\MinGW\bin
```

version

gcc --

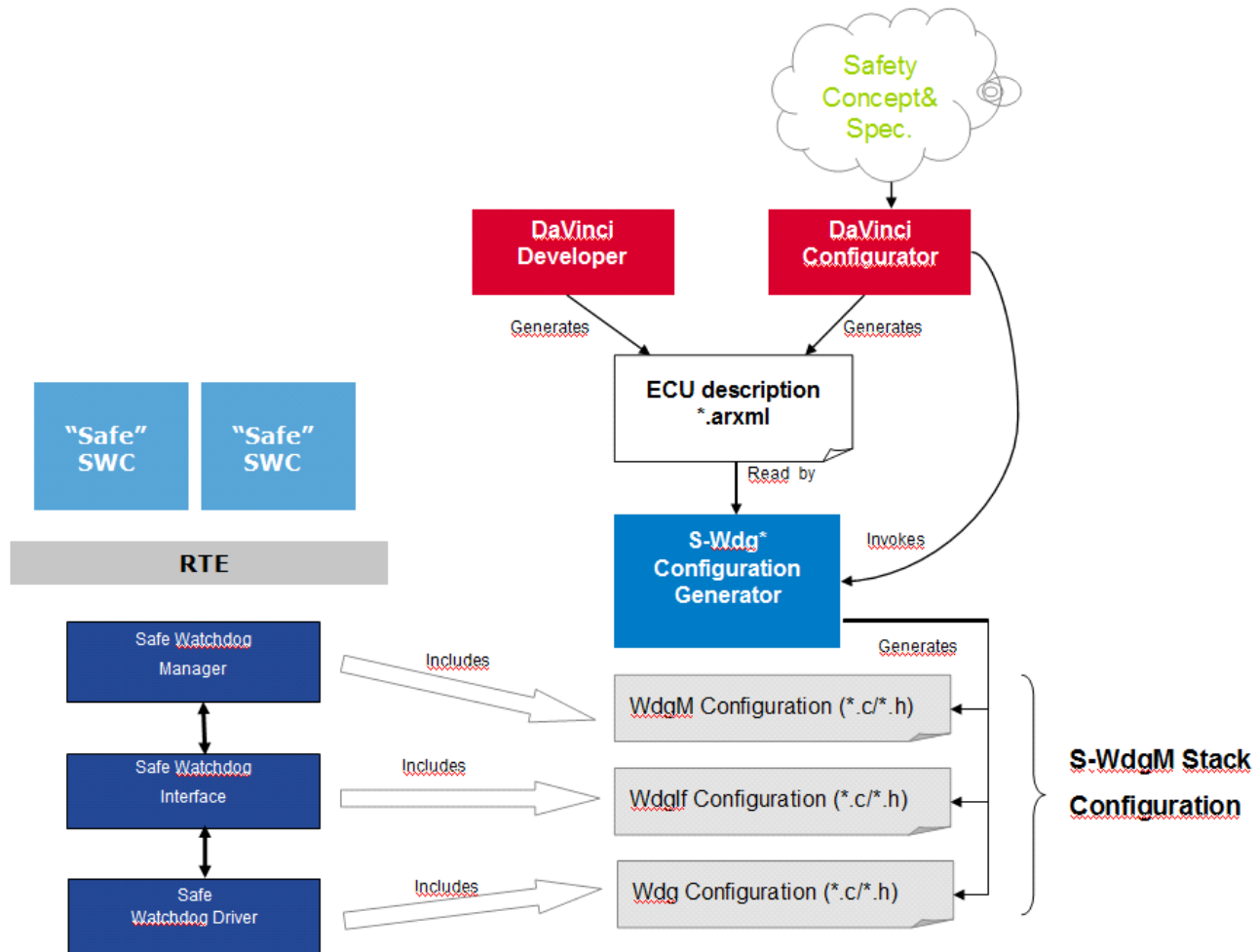


Fig. 24: Workflow of configuration generation and application for the S-WdgM

*.arxml

- `*.c` `*.h`
-

```
Wdg_Mgr_Cfg_Gen.exe <ecu_descr_file> <output_directory>
    <ecu_descr_file>
    *.arxml

    <output_directory>                                     *.c
    *.h
```

```

                                     WdgM_PBcfg.c
_____>
                                     >
                                     WdgM_MemMap.h
                                     WdgM_PBcfg.c
WdgM_OSMemMap.h
                                     WdgMAppTaskRef
WdgMGlobalMemoryAppTaskRef
```

WdgM_MemMap.h

```
Application_1_START_SEC_VAR_NOINIT_UNSPECIFIED
Application_1_STOP_SEC_VAR_NOINIT_UNSPECIFIED

/* Supervised Entity SE1 */
#ifdef WDG_M_SE1_START_SEC_VAR_NOINIT_UNSPECIFIED
#undef WDG_M_SE1_START_SEC_VAR_NOINIT_UNSPECIFIED
#define Application_1_START_SEC_VAR_NOINIT_UNSPECIFIED
#endif
#ifdef WDG_M_SE1_STOP_SEC_VAR_NOINIT_UNSPECIFIED
#undef WDG_M_SE1_STOP_SEC_VAR_NOINIT_UNSPECIFIED
#define Application_1_STOP_SEC_VAR_NOINIT_UNSPECIFIED
#endif
```

WdgMAppTaskRef

WdgMGlobalMemoryAppTaskRef

WDGM_

```
<platform>      <platform>
    MPC5604    TMS570LS3xx
```

- WdgM_PBCfg.c
- WdgM_PBCfg.h
- WdgM_MemMap.h

WdgM_OSMemMap.h

- WdgM_Cfg_Features.h

```
WdgM_PBCfg.c
WdgMConfig_Mode0
```

```
WdgM_Init(&WdgMConfig_Mode0)
WdgMConfig_Mode0
```

WdgMConfigSet



1	Bad call syntax.
2	Cannot open ECU description file `%s`.
3	Cannot convert float parameter `%s/%s` to an Watchdog ticks.
4	Cannot convert `%s` to a numerical value.
5	Fatal error.
6	Method `%s` must be implementd by subclass of `%s`.
7	Missing WdgM data.

1001	Checkpoint IDs belonging to Supervised Entity `%s` are not a zero-based list of increasing integers without gaps.
1002	No WdgMMode elements found.
1003	Supervised Entity `%s`: local transition starts at Checkpoint with an ID %d.
1004	No WdgMMode element with WdgMModeId %d found.
1005	ECU Description File has no `WdgM` element.
1006	Referencing non-existing checkpoint `%s`.
1015	No value found for parameter defined by `%s` in `Element` `%s`.
1016	Supervised Entity `%s` has no checkpoints.
1017	Supervised Entity `%s` defines local transitions for alien checkpoint(s) `%s`.
1018	Local Transition `%s` references alien checkpoint `%s`.
1019	Local Transition `%s` references wrong destination entity `%s`.
1020	Local Transition `%s` references wrong source entity `%s`.
1021	Cannot convert float parameter `%s/%s` (%.6f [s]) to an integral number of Watchdog ticks. (Using %.2f ticks per second).

1025	Ignoring `WdgMGeneral/WdgMNumberOfSupervisedEntities`.
1026	Found more than one `WdgMMode` elements; generating code for mode with ID %d.
1027	Cannot find top level element %s.
1028	No value found for `#define %s`. Verify element defined by `.../%s`.
1029	No `.../WdgM/WdgMGeneral/WdgMWatchdog` elements found.
1031	No transition found for WdgMDeadlineSupervision `%s` between Supervised Entity `%s`, Checkpoint `%s` and Supervised Entity `%s`, Checkpoint `%s`.
1034	Found a `REFERENCE-VALUE` element defined by `%s` without a `VALUE-REF` child element.
1035	Cannot find `REFERENCE-VALUE` element defined by `%s`.
1036	Checkpoint `%s` has no ID.
1037	Checkpoint `%s` has no `VALUE` element for its ID.
1038	Missing `SHORT-NAME` element.
1039	No global initial Supervised Entity found.
1040	Program Flow Supervision has no checkpoint defined by %s.
1043	Watchdog `%s` has no `WdgMTrigger` element assigned to it.
1044	Cannot identify driver.
1045	No `WdgMLocalStatusParams` element found.
1048	Cannot find checkpoint ID for `%s/%s`.
1049	Cannot find checkpoint ID for `%s/%s`.
1050	Cannot find checkpoint ID for `%s`.
1051	`%s` is an AUTOSAR 3.1 Supervised Entity and therefore shall have exactly one checkpoint and this checkpoint shall have its ID set to 0.
1052	Supervised Entity `%s`: `WdgMFailedProgramFlowRefCycleTol` is positive (%d) but `WdgMProgramFlowRefCycle` is not (%d).
1053	Supervised Entity `%s`: Zero tolerance for program flow violations - `WdgMProgramFlowRefCycle` set to %d and `WdgMFailedProgramFlowRefCycleTol` set to zero.
1054	Supervised Entity `%s`: `WdgMFailedDeadlineRefCycleTol` is

	positive (%d) but `WdgMDeadlineReferenceCycle` is not (%d).
1055	Supervised Entity `%s`: Zero tolerance for dealine violations - `WdgMDeadlineReferenceCycle` set to %d and `WdgMFailedDeadlineRefCycleTol` set to zero.
1056	WdgMAliveSupervision `%s` (checkpoint `%s`): `WdgMSupervisionReferenceCycle` (%d) must be a positive value.
1057	Supervised Entity `%s`: `WdgMFailedSupervisionRefCycleTol` set to a positive value (%d) but there is no alive counter attached to any of its checkpoints.
1058	Mandatory `LocalStatusParams` data is missing.
1059	Shortest maximum deadline (%s: %f seconds) is shorter than `WdgMSupervisionCycle` (%f seconds).
1060	Mode with ID `%d` (`WdgMTicksPerSecond`: %d; `WdgMSupervisionCycle`: %f) fails to meet timing requirement `(1 / WdgMTicksPerSecond) <= WdgMSupervisionCycle`.
1061	Watchdog `%s`, trigger mode ID %s: the requirement `WdgMTriggerWindowStart <= WdgMSupervisionCycle <= WdgMTriggerConditionValue` is not fulfilled
1062	Verify that every Supervised Entity has a unique ID.
1063	No local incoming transitions defined for checkpoint `%s` in Supervised Entity `%s`. Reaching `%s` will trigger a Program Flow violation.
1064	Supervised Entity `%s` has no initial checkpoint.
1065	Callback function(s) `%s` will never be executed because `WDGM_STATE_CHANGE_NOTIFICATION` is turned off.
1066	`WDGM_STATE_CHANGE_NOTIFICATION` is turned on but there is no callback function defined. Verify the `WdgMGlobalStateChangeCbK` and `WdgMLocalStateChangeCbK` values
1068	Ensure that Supervised Entities have callback functions with a unique name.
1069	Local end checkpoint %s/%s must not be the source of a local transition.
1070	Local init checkpoint %s/%s must not be the destination of a local transition.

1071	The Supervised Entity IDs are not a zero-based list of integers without gaps.
1072	The watchdog driver is called in the context of the watchdog manager and its global variables must be placed in the same section as the watchdog manager's global variables in the presence of memory protection! (The watchdog driver global variables are placed in `%s` and the watchdog manager global variables are placed in `%s`).
1073	This driver configuration generator supports %s -- %s is not supported.
1075	The targeted precision (%d ticks per second) is too high; please lower the resolution (`.../WdgMMode/WdgMTicksPerSecond`).
1076	There is no WdgMTrigger element associated to Watchdog `%s`.
1081	No drivers found
1082	No Watchdog Interface devices found
1083	Watchdog IF device `%s` references non-existing Watchdog `%s`
1084	Watchdog `%s` references non-existing Watchdog IF device `%s`
1085	`WdgMTicksPerSecond` must not be zero if the Watchdog Manager uses an external tick counter source for deadline monitoring.
1086	Supervised Entity `%s` contains more than one checkpoint having an alive counter
1090	No Supervised Entities found!
1091	Transition `%s` references non existing checkpoint `%s` in entity `%s`.
1092	ECU Description File references non-existing checkpoint `%s` in Supervised Entity `%s`.
1093	Supervised Entity `%s` contains references to non-existing checkpoint(s) `%s`.
1094	Global Transition `%s` has non-existing Entity `%s` as source.
1095	Global Transition `%s` has non-existing Entity `%s` as destination.
1096	WdgMDeadlineSupervision `%s`: `WdgMDeadlineMin` (%s) is greater than `WdgMDeadlineMax` (%s).
1097	The `%s` value (%s [s]) of `%s` must not be greater than %s [s].
1098	For the INTERNAL_SOFTWARE_TICK the `(1 / WdgMTicksPerSecond[Hz])

= WdgMSupervisionCycle[s]` relation must be kept;
the configured values for `WdgMTicksPerSecond` (%s) and
`WdgMSupervisionCycle` (%s) do not fulfill this requirement.

1099	This ECU Description File's AUTOSAR version (%s) is not compatible with the version supported by this configuration generator (%s)
1100	This ECU Description File's AUTOSAR version (%s) has a different minor number than the version supported by this configuration generator (%s)
1101	Watchdog Driver `%s` is configured to have an active tick counter but the Watchdog Manager is not configured to have an internal HW timebase.
1102	The Watchdog Manager is configured to use an internal HW counter but the Watchdog Interface is not.
1103	The Watchdog Interface is configured to use an internal HW counter but the Watchdog Manager is not
1104	The Watchdog Manager is configured to use an internal HW tick counter but the Watchdog driver `%s` has no active tick counter.
1105	Error while reading list of `WdgMCallerIds`
1106	The Watchdog Manager is configured to use an internal HW tick counter but the Watchdog Interface does not reference any Watchdog Driver at all.
1107	The Watchdog Manager is not configured to use an internal HW tick counter but the Watchdog Interface has a reference to a Watchdog Driver with an internal tick counter.
1108	Every `WdgWatchdog` has to have the same number (either %d or %d) of associated `WdgMTrigger` elements.
1109	Verify that the Trigger Modes belonging to each trigger have IDs building a zero-based integer sequence without any gaps
1110	Invalid `WdgMInitialTriggerModeId` value (%d).
1111	The `SafeTcore` platform requires `WdgWindowStart` = 0 [ms]. (Current value: %s)
1112	`WdgMWatchdogMode` is set to `WDGIF_OFF_MODE`: `WdgMTriggerConditionValue` and `WdgMTriggerWindowStart` will be ignored

1113	Ticks per second must be greater than zero
1114	Multiple `WdgMDeadlineSupervision` elements defined for the transition from %s/%s to %s/%s
1115	OS partition reset is currently not supported.
1116	The current version supports only configurations having only one Watchdog, one IF device and one driver.
1119	The value 65535; e.g., $2^{16} - 1$, must not be assigned to any of these elements: `WdgMFailedDeadlineRefCycleTol`, `WdgMFailedProgramFlowRefCycleTol` and `WdgMFailedSupervisionRefCycleTol`.
1120	Cannot find a VALUE element for `...WdgMConfigSet/WdgMMode/WdgMInitialTriggerModeId`
1121	Cannot find a VALUE element for `...WdgMConfigSet/WdgMMode/WdgMTrigger/WdgMTriggerModeId`
1122	Global transition connecting checkpoints `%s` and `%s` in the same entity `%s` is not allowed.
1123	`WdgMSupervisionCycle` (%s) is not greater than zero
1124	Watchdog `%s`, trigger mode ID %s: `WdgMTriggerConditionValue` is not greater than zero.

NrOfSupervisedEntities

	NrOfStartedGlobalTransitions	
		WdgMExpectedAliveIndications
		WdgMMinMargin of .../WdgMMinMargin
		WdgMMaxMargin of .../WdgMMaxMargin
	WdgMSupervisionReferenceCycle of .../WdgMSupervisionReferenceCycle	
	NrOfLocalTransitions	
	NrOfGlobalTransitions	
		WdgMExpectedAliveIndications
		WdgMMinMargin of
		WdgMMaxMargin
	WdgMSupervisionReferenceCycle of	
	WdgM_TransitionType-> WdgMDeadlineMin of	
	WdgM_TransitionType-> WdgMDeadlineMax of	
	WdgM_GlobalTransitionType-> WdgMDeadlineMin of	

	WdgM_GlobalTransitionType-> WdgMDeadlineMax		
	WdgMitialStatus	WdgMSupervisedEntityInitialMode	WdgMLocalStatusParams
	X	Y	X
	WdgMFailedSupervisionRefCycleTol	WdgMFailedSupervisionRefCycleTol	
	Y		
	WdgMLocalStatusParams		
	X	Y	X
	WdgMFailedDeadlineRefCycleTol	WdgMFailedDeadlineRefCycleTol	
		Y	
	WdgMLocalStatusParams		
	X	Y	X
	WdgMDeadlineReferenceCycle	WdgMDeadlineReferenceCycle	
		Y	
	WdgMDeadlineReferenceCycle	WdgMLocalStatusParams	
	X	Y	X
	WdgMFailedProgramFlowRefCycleTol	WdgMFailedProgramFlowRefCycleTol	
	Y		
	WdgMLocalStatusParams		
	X	Y	X
	WdgMProgramFlowReferenceCycle	WdgMProgramFlowReferenceCycle	
	Y		
	WdgMLocalStatusParams		
			OSApplication
	WDGM_INVALID_OSAPPLICATION		
	WdgMCheckPoint		
	CP-ID		
	WdgMGeneral	WdgMVersionInfoApi	
	WDGM_VERSION_INFO_API	WdgM_Cfg_Features.h	
	WdgMGeneral	WdgMDevErrorDetect	
	WDGM_DEV_ERROR_DETECT	WdgM_Cfg_Features.h	
	WdgMGeneral	WdgMDemReport	
	WDGM_DEM_REPORT		

	WdgMGeneral	WdgMDefensiveBehavior	
	WDGM_DEFENSIVE_BEHAVIOR		WdgM_Cfg_Features.h
	WdgMGeneral	WdgMImmediateReset	
	WDGM_IMMEDIATE_RESET		WdgM_Cfg_Features.h
	WdgMGeneral	WdgMOffModeEnabled	
	WDGM_OFF_MODE_ENABLED		WdgM_Cfg_Features.h
	WdgMGeneral	WdgMUseOsSuspendInterrupt	
	WDGM_USE_OS_SUSPEND_INTERRUPT		WdgM_Cfg_Features.h
	WdgMGeneral	WdgMTimebaseSource	
	WDGM_TIMEBASE_SOURCE		WdgM_Cfg_Features.h
	WdgMGeneral	WdgMSecondResetPath	
	WDGM_SECOND_RESET_PATH		WdgM_Cfg_Features.h
	WdgMGeneral	WdgMTickOverrunCorrection	
	WDGM_TICK_OVERRUN_CORRECTION		WdgM_Cfg_Features.h
	WdgMGeneral	WdgMEntityDeactivationEnabled	
	WDGM_ENTITY_DEACTIVATION_ENABLED		WdgM_Cfg_Features.h
	WdgMGeneral	WdgMStateChangeNotification	
	WDGM_STATE_CHANGE_NOTIFICATION		WdgM_Cfg_Features.h
	WdgMGeneral	WdgMUseRte	WDGM_USE RTE
	WdgM_Cfg_Features.h		
	WdgMGeneral	WdgMDemSupervisionReport	
	WDGM_DEM_SUPERVISION_REPORT		WdgM_Cfg_Features.h
	WdgMGeneral	WdgMFirstCycleAliveCounterReset	
	WDGM_FIRSTCYCLE_ALIVECOUNTER_RESET		WdgM_Cfg_Features.h
	WDGM_GLOBAL_TRANSITIONS	WdgM_Cfg_Features.h	STD_ON
		STD_OFF	
	WDGM_AUTOSAR_3_1_X_COMPATIBILITY	WdgM_Cfg_Features.h	
	STD_ON	WdgMSupportedAutosarAPI	
		API_3_1	STD_OFF

WDGM_MULTIPLE_TRIGGER_MODES

STD_ON

WdgMTrigger

WdgMTriggerMode

STD_OFF

	WdgMIsEndCheckpointGlobal	TRUE
	WdgMAliveLRef	NULL_PTR
	WdgMAliveGRef	NULL_PTR
	WdgMDeadlineMonitoring	TRUE
	FALSE	
	WdgMOutgoingDeadlineMax	
	WdgMLocalTransitionRef	NULL_PTR
	WdgMGlobalTransitionsRef	NULL_PTR
	WdgMStartsAGlobalTransition	TRUE
		FALSE
	WdgMFailedProgramFlowRefCycleTol	<div></div>
	WdgMProgramFlowReferenceCycle	<div></div>
	WdgMFailedDeadlineRefCycleTol	<div></div>
	WdgMDeadlineReferenceCycle	<div></div>
	WdgMFailedDeadlineRefCycleTol	<div></div>
	WdgMDeadlineReferenceCycle	<div></div>

```

WdgMDeadlineSupervision
WdgMSupervisionCycle
WdgMDeadlineMax
WdgMTicksPerSecond
1 / WdgMTicksPerSecond
WdgMSupervisionCycle

```

```

WdgMSupervisionCycle

```

```

0 < ticks_per_second <= rti_hz / 2

```

```

(ticks_per_second * window_start * 0.001) <= 65535
int (round 65535)

```

```

(ticks_per_second * condition_value * 0.001) <= 65535
int (round 65535)

```

```

WdgMWatchdog
WdgMTrigger

```

```


```

```


```

```


```

```


```

```

WdgMDeadlineSupervision

```

```

(1 / tps) * MAX_16_BIT_VALUE

```

```

[s] (1 / WdgMTicksPerSecond[Hz]) = WdgMSupervisionCycle

```

```


```

```

WdgMDeadlineSupervision

```

```


```

	WdgMProgramFlowMonitoring
--	---------------------------

WdgMTrigger

	(WdgMFailedProgramFlowRefCycleTol = 0) OR (WdgMProgramFlowRefCycle > 0)	<div></div>
	WdgMTriggerTimeout	WdgMTriggerMode
	WdgM_TriggerModeType	<div></div>

--	--

WdgMSupervisedEntityRef

	EntityStatusLRef
--	------------------

EntityStatusGRef

	WdgMAliveLRef	NULL_PTR
	WdgMAliveGRef	NULL_PTR

WdgM_ConfigType

DataGSRef

	WdgM_ConfigType	DataGRef
--	-----------------	----------

WdgM_ConfigType

EntityGSRef

	WdgM_ConfigType	GlobalTransitionFlagsGS
	NULL	

WdgM_GlobalTransitionType->GlobalTransitionFlagId
WdgM_GlobalTransitionType

	EntityStatusLRef
--	------------------

EntityStatusGRef



[illegible]

	<div>WDGM_LOCAL_STATE_OKWDGM_GLOBAL_STATE_OK<div><div></div></div></div>
	<div>WdgMTimebaseSource<div>WdgM_UpdateTickCounter()</div></div>

[illegible]

	<ul style="list-style-type: none">• WdgMTriggerWindowStart• WdgMTriggerConditionValue• WdgMWatchdogMode
