



Efficient Development of Automotive Embedded Systems by Renesas, OpenSynergy, iSYSTEM and INCHRON

Demonstrator Setup













Central Controller

Sensor Data Fusion (ASIL-D) Body Functions (ASIL-B)





R H 8 5 0 / F 1 x





Sensor Radar Radar Processing (ASIL-B) Crash Detection (ASIL-D)





R H 8 5 0 / F 1 x





CAN Bus





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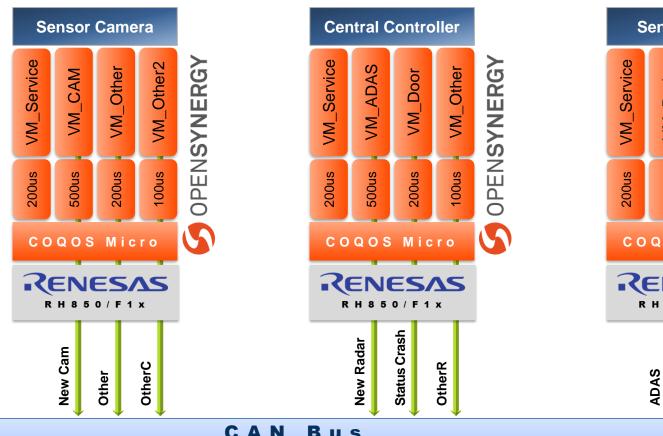
Data flow





VM and CAN Setup





S	enso	r Ra	ada	r			
VM_Service	VM_Radar		רטאאט_ אין	VM Other		OPENSYNERGY	
200us	200us	31.000	ZOOUS	100118	5	OPEN	
СО	Q O S	M	i c	r o		S	
R	EN H 8 5	E S		\ <u>\</u>	5		
	ADAS	Joor		JtherCC			

CAN Bus

ID	Name	
0x100	NewCam	
0x110	Other	
0x120	OtherC	

Demonstrator Setup





Enhance the capabilities of your existing trace and debug tool



Reliable decisions

Function mapping Execution order Partitioning Activation period Priority Start offset Core affinity Resource sharing



Intuitive trace visualization

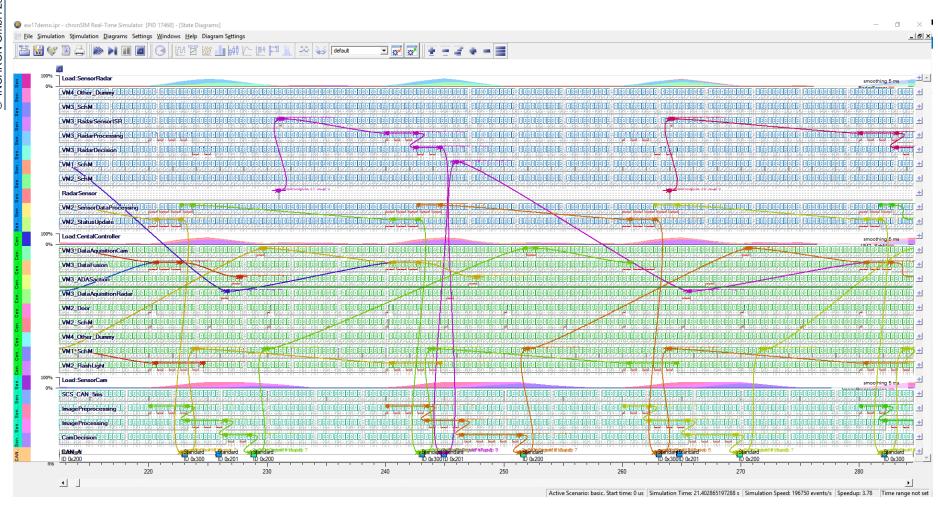
RTOS states **Function nesting Events Data values** Rate changes **Data flows** Stack consumption

Efficient analysis and diagnosis

CPU load Net execution time Response time **Jitter End-to-end latency** Data age / loss / reuse **Blocking time**

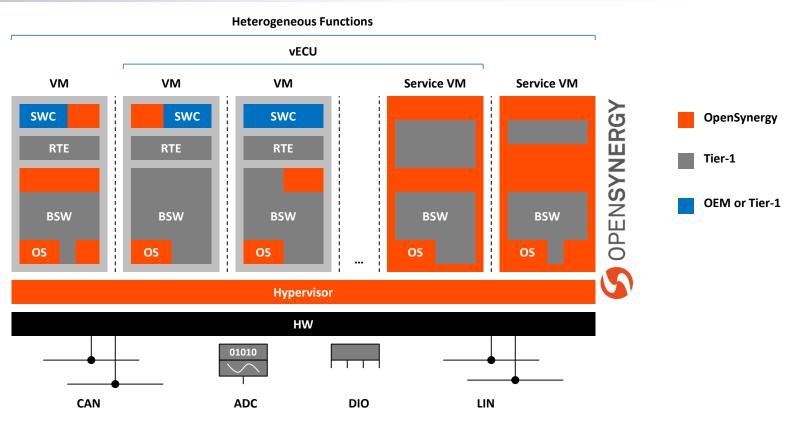
Combined Trace with Event chains





Overview COQOS Micro

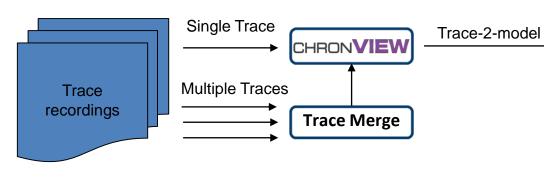




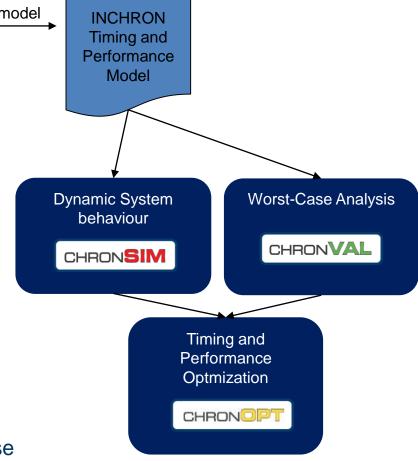
- A VM (Virtual Machine) is a software container running on top of the separation kernel. A VM consists of a single OS and user software. 3rd-party BSW, RTE and SWC may be part of a VM to provide system functions.
- The Hypervisor (separation kernel) is responsible for the scheduling of the VMs and for the software containment (freedom from interference – ISO 26262).

- A Service VM is a specialized VM able to provide basic functionality to VMs (shared access to I/O as an example) as an intra-ECU service.
- The COQOS Micro software platform supports the clustering of VMs to enable the concept of vECU.
 A vECU is able to act as a standard ECU (diagnostics as an example) at the vehicle system level.





- Enlarge test coverage
- Investigate new scenarios
- Detect performance bottlenecks
- Understand dynamic system behavior
- Follow event chains through complete system
- Visualize all information on the same time base



Measurement - Simulation - Validation



