Migration from Single-Core to Multi-Core Architecture

DENSO

> *With TA Tool Suite and consulting support of TA, the migration of legacy code to multi-core systems is less challenging*

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With TA Tool Suite, Denso Automotive verifies the design and automatically detects different multi-core design architectures of their powertrain system, by meeting the requirements and overall system constraints.

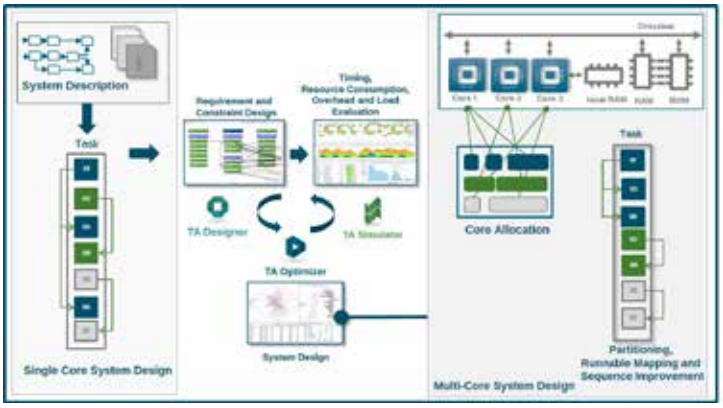

Figure 1: Multi-Core System Architecture Design Approach

Tool Solution

TA Optimizer

TA Simulator

TA Designer

The Challenge

- Automatic partitioning of tasks/runnables to cores with insignificant modification in the system's design
- Maintenance of system constraints during core allocation and partitioning of AUTOSAR software components
- Data consistency/coherency analysis and observation of a synchronization mechanism for data protection with the least synchronization overhead
- Evaluation of communication overhead, memory accesses and the effects of the operating system's overhead on timing

The Solution

- Evaluation of timing behavior of the software at high CPU load by using TA Simulator
- Evaluation of hardware resource consumption and overhead in semiconductor processors and vendor specific operating systems
- Definition of runnable sequencing/affinity constraints for maintaining the AUTOSAR software component design
- The system design solution, provided by TA Optimizer under considerations of constraints, obtain improved timing of the system, distributed task load, and only few system changes

The Benefits

High level verification of different multi-core design architectures, under considerations of the hardware, the operating system, and the system constraints. This represents the early phases of the multi-core development and before target testing of the partitioned system.