Capital VSTAR

Streamlined ECU software development

Benefits

- Scalable AUTOSAR classic platform
- Usable in all vehicle domains
- Confirmed to meet ISO 26262 and ASIL A-D use-cases
- AUTOSAR operating system supporting all classes of scalability
- Top-down toolchain supports AUTOSAR methodology
- Export and import various formats

Advanced ECU design with AUTOSAR software and tooling

Since its inception in 2002 (team checked), AUTOSAR has established itself as the foundation for electronic control unit (ECU) design and development. From an engineer's perspective, whether integrating the latest AUTOSAR release, or developing a new ECU extract from the OEM, the AUTOSAR enabled ECU design process must be as streamlined as possible – and support increased levels of functionality as ECU complexity grows.

The Siemens' AUTOSAR solution is at the forefront of addressing these challenges. Capital® VSTAR™ is Siemens' implementation of the AUTOSAR standard and is a complete offering with tools and software platform to meet all ECU platform needs. Unique to Siemens' AUTOSAR solution is support from a single Capital VSTAR tool that covers the entire AUTOSAR development cycle. Capital's AUTOSAR tools provide a round-trip solution from ECU extract updates and upgrades to configuring the software platform.

Capital VSTAR Integrator is the configuration frontend to the Capital VSTAR product. Capital VSTAR Integrator is the natural configuration companion that contains import functions for standard automotive data exchange formats. This function is coupled with Capital VSTAR Integrator's ECU Configuration Generator (ECG). The ECG processes the supplied data from up-stream system tools, ideally on the AUTOSAR data exchange formats and automatically configures applicable parts of the Capital VSTAR software platform and provides design support for software components. As the ECU software is generated, the correctness of the configuration is continuously verified by a built-in consistency checker. Engineers are able to achieve continuous integration and release with the tools that support software component (SWC) authoring and configuration along with the round-trip capability to seamlessly update ECU configurations.

Integration and configuration

Siemens Digital Industries Software provides integration with customer-specified combinations of microcontrollers (MCUs), compilers, debuggers, peripherals, microcontroller abstraction layers (MCALs) and OEM-specific compatibility modules that include basic software (BSW), complex device drivers (CDD) and software components (SWC).

Embedded systems for automotive

Capital VSTAR integrates with other embedded automotive offerings from Siemens. Since Capital VSTAR contains the essential software for the communication buses as the ECU vehicle interface, it can be integrated in a complex ECU context with an application OS either on a stand-alone microprocessor or in a System-on-Chip (SoC) architecture.

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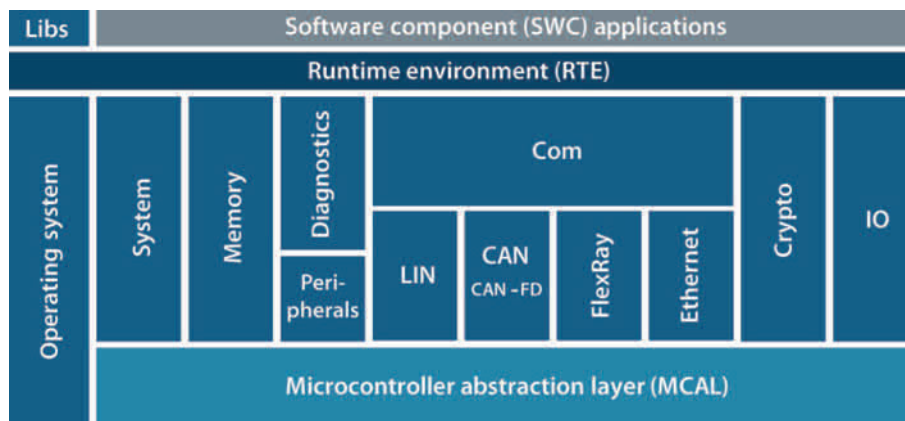# Capital VSTAR

Operating system (OS)

The Capital VSTAR OS is an AUTOSAR OS that can be efficiently implemented on different processor architectures. The Capital VSTAR OS is available in all AUTOSAR scalability classes and supports multicore architectures. Siemens has a long tradition of developing efficient and optimized OSes in various industries.

Runtime environment (RTE)

The Capital VSTAR RTE tool integrates the AUTOSAR application with the Capital VSTAR software platform. Capital VSTAR Integrator has complete support for SWC designs and RTE configurations. The RTE enables the partitioning of software components and BSW into different runtime segments and provides safe compartmentalization of the OS when integrating third party components or mixing safety-related SWCs in one node.

Microcontroller abstraction layer (MCAL)

Siemens Digital Industries Software works closely with MCU and compiler vendors to expand the portfolio of solutions and provide the best fit for ECUs. Siemens engineers are constantly integrating Capital VSTAR with suppliers of microprocessors and providers of MCALs; these companies include Infineon, NXP, Renesas, ST Microelectronics and Texas Instruments to name a few. Siemens can also supply custom MCALs integrated with Capital VSTAR Integrator.

Capital VSTAR software platform enabling the full AUTOSAR architecture.

Functional safety

Capital VSTAR has been implemented with SPICE level 3 development processes and safety as a top concern adhering to the ISO 26262 standard. A key concept in ISO 26262 is the Safety Element out of Context (SEooC); OS, E2E protection and watchdog are some of the component/packages available as SEooC with ASIL D classification.

Cybersecurity

The standard AUTOSAR components for on-board cybersecurity are an integral part of Capital VSTAR. Multi-layered capabilities include Secure Onboard Communication (SecOC) in addition to the standardized crypto components. The crypto drivers make use of custom hardware features such as crypto algorithm acceleration and key storage. Siemens Digital Industries Software also expands the offering with non AUTOSAR specified components such as a state-of-the-art IP Firewall.

Features

- AUTOSAR Classic software platform

- ECU Configuration Generator

- Communication implementation for LIN, CAN/CAN-FD, Ethernet and FlexRay

- Efficient multi-bus gateway implementation

- Multicore support, SWC and BSW distribution over multiple partitions

- Profiling option for execution of time-critical applications

- Scalable for small footprint and high performance platforms

- Round-trip interfaces to other tools

- Powerful scripting support

Siemens Digital Industries Software
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