The rising expectations of high-end ECU development

The expectation among ECUs today is that they are part of the overall vehicle infrastructure throughout the life cycle. When implementing a high-end ECU such as an IVI system based on a high-end operating system (OS) for example, there are multiple mandatory vehicle functions that are not part of the base system. Main functions such as diagnostics and power management are completely missing. As the industry focuses more on the ECU specific part of the central configuration, one of the key functions is distributed on the AUTOSAR specified ECU Extract format. It would be far more efficient to directly configure the high-end ECUs with the ECU Extract.

Adaptive Connection Layer (ACL)

Mentor® Automotive VSTAR™ Adaptive Connection Layer (ACL) provides a stable base for high-end systems based on Linux®/POSIX which allows for the integration of standardized vehicle communication and system functions. By providing access to the standardized AUTOSAR methodology for configuring the vehicle functions, all needs for fully integrating the ECU are satisfied – even among complex ECUs – just like any other ECU from a system point of view.

Linux and AUTOSAR

All the necessary AUTOSAR basic software (BSW) components are natively executing in the Linux process, leveraging the use of existing modules to enable required functionality. VSTAR ACL makes use of the standard Linux components, such as the TCP/IP stack, and connects the interfaces to the AUTOSAR environment. The AUTOSAR messages and data structures are generated by the same tools used for the general AUTOSAR node. Further, VSTAR ACL has a specific component for connecting to interprocess communication (IPC). As the BSW provides the same execution environment as any AUTOSAR node, it is possible to execute a software component (SW-C) in the same way as in any AUTOSAR node. The AUTOSAR Runtime Environment (RTE) interfaces to the ACL IPC proxy SW-C defining the configuration for the Remote Process Generator, which in turn, makes it possible to connect any other system application to the AUTOSAR application. The proxy can make use of all the

PRODUCT FEATURES:

■ AUTOSAR 4.2 and 4.0.3 support
■ Embeds any AUTOSAR BSW components necessary for application purposes
■ Standard AUTOSAR configuration methodology
■ Standard AUTOSAR software component support
■ Support for native Linux interprocess communication (IPC) methods
■ Available in bundle with Mentor® Automotive Connected OS™
■ Suitable for all AGL applications
■ Can be combined with an AUTOSAR MCU to support hard vehicle requirements
■ Inter SoC – MCU communication protocols available

RELATED MENTOR PRODUCTS:

■ Mentor® Automotive Volcano™ VSx Tool Suite – Integrated for top-down vehicle and ECU system design. VSTAR is part of the comprehensive Mentor Automotive Volcano AUTOSAR toolchain which includes:
  - Volcano Vehicle System Architect™ (VSA) – Architecture design tool
  - Volcano VSA COM Designer™ – Network design tool
  - Volcano Vehicle System Builder™ (VSB) – ECU configuration tool
  - Volcano Vehicle Systems Integrator™ (VSI) – Simulation tool
  - Volcano Vehicle Systems Utilities™ (VSU) – Utilities tool
■ Mentor® Automotive Connected OS™ – Automotive-grade, GENIVI-compatible Linux software platform.
■ Mentor® Embedded Sourcery™ CodeBench and Analyzer – Embedded systems development and analysis tools offering deep insight and trace data visualization.
available IPC mechanisms such as sockets, named pipes, etc. This enables bi-directional use of the AUTOSAR internal system functions such as diagnostics and mode management.

The AUTOSAR methodology is the base for the entire configuration and the provided ECU Extract is no different from any other node. As many OEMs make use of specific AUTOSAR components either within the BSW, as a complex device driver, or as a software component, the conformance to the OEM requirements is the same as for all other ECUs.

AUTOSAR OS on Linux – and other supported operating systems

VSTAR ACL enabling the use of AUTOSAR on Linux, is available as part of the GENIVI-compatible Mentor Automotive Connected OS™ platform. GENIVI standard interfaces such as DLT and CommonAPI with Franca IDL to define the IPC communication are also supported. And because VSTAR ACL makes use of embedded Linux functionality, all general Automotive Grade Linux (AGL) versions are also supported.

An ACL application can be connected to any of the automotive specified buses; it is only necessary to provide a low-level driver interface. And as long as system requirements support the necessary startup time, bus compatibility can be achieved. Inside the Linux process is the AUTOSAR system driven by an AUTOSAR OS adapted to run on top of POSIX threads. The AUTOSAR on Linux application can therefore provide as good a real-time capability as the underlying Linux system provides. VSTAR ACL can be used within a single SoC providing the sole AUTOSAR support in the node, or in combination with a separate core on the SoC (or external MCU), providing a native AUTOSAR implementation with the high demand requirements of ECU startup and communication behavior. In a different use-case scenario, VSTAR ACL can be utilized to extend AUTOSAR functionality to the Linux core and provide the necessary application support.

More about Mentor Automotive

Mentor Automotive provides advanced systems engineering solutions with a leading portfolio of automation design tools and software, built on deep expertise in systems engineering, to help customers solve the most complex design challenges facing the industry. Solutions reside in three key areas for automotive electrical and electronic design: connectivity and networking; in-car experience; and subsystems and technology.