Elektrobit’s Classic and Adaptive AUTOSAR products

Jerry Gao, Sales Manager, Elektrobit (EB)
30 May 2019, Shanghai

In cooperation with STMicroelectronics
Agenda

I. Market overview and trends
II. Classic and Adaptive AUTOSAR software from EB
III. Detailed overview of EB tresos product line
IV. Detailed overview of EB corbos product line
Market overview and trends

Trends

Automated driving

e-Mobility

Mobility services

Industry needs

• Safety
• Security
• Quality products
• Sophisticated equipment
• Energy efficiency
• Convenient, up to date technology
Evolution of vehicle network architecture

Domain architecture

Centralized architecture

Future architecture
Classic and Adaptive AUTOSAR software from EB

Evolution of vehicle network architectures

- **Domain architecture**
- **Centralized architecture**
- **Zoned architecture**

Classic AUTOSAR

Adaptive AUTOSAR

Automotive Ethernet
Classic and Adaptive AUTOSAR software from EB

Evolution of vehicle network architectures

Classic AUTOSAR

Adaptive AUTOSAR

Automotive Ethernet
EB tresos – Industry leading implementation of classic AUTOSAR basic software

Perfect solution for your next ECU project

Highlights

• Efficient and scalable AUTOSAR-compliant and OSEK/VDX-compliant products for ECUs
• Full AUTOSAR support with one basic software stack, and one tool environment
• Safe and ready for series production
• Single-/multi-core operating systems
• Tailor-made products, services and support

Benefits

• Highest safety levels
• Time and cost savings through reusable software functions
• Safe, and reliable mass production ready software
Cross-OEM products

EB tresos product line

• Efficient and scalable AUTOSAR-compliant and OSEK/VDX-compliant products for ECUs
• Basic software (BSW) and runtime environment (RTE)
• Single-/multi-core operating systems
• Functional safety and security solutions
• Network protocols, e.g. Ethernet
OEM-specific products

Solution excellence

• Implementing car manufacturers’ software requirements that are not covered by AUTOSAR
• Exchanging AUTOSAR basic software modules with OEM specific modules, e.g.
  – Diagnostics
  – Security
  – Communication stack
• Products which extend our AUTOSAR BSW, e.g.
  – Software Components (SWCs)
  – Complex Device Drivers (CDDs)
Strong partner ecosystem

• EB tresos Studio is the industry-standard tool for microcontroller abstraction layer (MCAL) development by semiconductor suppliers.
• We are integrating the MCALs of the majority of hardware vendors, so that it can be configured with our tool.
• Partnership with STM:
  – Integrates EB tresos ACG8 on SPC58XC (Chorus 4M) and SPC584B (Chorus 2M)
  – STM is using EB tresos Studio for their AUTOSAR MCAL development
Automotive Ethernet – Increasing data transfer
High bandwidth to support increasing data transfer

- Solutions for all use cases from CAN and LIN to FlexRay, CAN FD, and IP/Ethernet
- Providing a high quality level for implementation, ensured by extensive Ethernet conformance tests
- Transmission rates delivery is 100 times higher than CAN
- Embedded in the AUTOSAR-based EB tresos AutoCore product family
Classic and Adaptive AUTOSAR software from EB

Evolution of vehicle network architectures

Domain architecture
Centralized architecture
Zoned architecture

Classic AUTOSAR
Adaptive AUTOSAR

Automotive Ethernet
Infrastructure architectures with HPC are clean and simple

80-100 ECUs
6 CAN-Bus
2 FlexRay
1 Ethernet backbone

4 High-performance ECUs
60 Sensor/Actuator ECUs
1 Ethernet backbone
1 CAN per zone
EB corbos – Where safety meets performance

Bringing Adaptive AUTOSAR on the road

Highlights
• Provides run-time environment, software update capability, and embedded security
• Is based on the portable operating system interface (POSIX)
• Has several operating systems running on one processor
• Provides hardware virtualization
• Provides separation between virtual machines on different CPU cores
• Has in-kernel safety-monitoring for critical parts

Benefits
• Guarantees highest safety levels for automated driving
• Reduces system complexity
• Saves time and cost through re-usable software functions
• Adds functions easily, fast, and securely over the air
• Integrates connected and automated driving applications easily through a standardized software framework
• Saves physical space by integrating multiple systems on one device
• Optimizes resource utilization
EB corbos

A product line bringing Adaptive AUTOSAR on the road

**EB corbos AdaptiveCore**
Adaptive platform for safe and secure applications

**EB corbos Hypervisor**
Micro-kernel based hypervisor to run multiple (different) operating systems on one single CPU

**EB corbos Linux**
Container based Linux distribution

**EB corbos Studio**
Integrated development environment for EB corbos products
EB corbos – The architecture behind the product

- New CPU-intensive (safety-relevant) functions: e.g. sensor fusion
- Novel user functions: e.g. App Store
- Takeover of existing vehicle functions from Classic AUTOSAR (SWCs)
- Secure startup, authentication
- Safety-relevant vehicle functions, monitoring of performance partitions

Diagram:

- High-performance Computer
- Secure Boot
- Performance Cores
- Safety Cores
- Hypervisor
- Performance Partitions
  - App:
    - Adaptive AUTOSAR
    - POSIX OS
    - Virtual Machine
  - App:
    - Adaptive AUTOSAR
    - POSIX OS
    - Virtual Machine
  - App:
    - Classic AUTOSAR
    - AUTOSAR OS
    - Virtual Machine
- Security Partition
  - App:
    - Trusted Execution Environment
    - Trusted OS
- Safety Partition
  - App:
    - Classic AUTOSAR
    - AUTOSAR Safety OS
Software infrastructure for high performance controller

Mastering the complexity of high performance controllers with EB corbos

Highlights
• Applicable for all domains: infotainment, highly automated driving, etc.
• Modular architecture, flexible configuration of building blocks
• Possibility to add new functions through updates
• Hardware agnostic (ARM, Intel, NVIDIA, etc.)
• First company to launch complete Adaptive AUTOSAR based software stack (EB corbos)

Benefits
• One-stop-shop for safe and secure high performance computing
• Pre-integrated software modules save time and costs
• Prepared for operations of software infrastructure for 10+ years
EB-specific extensions for high-performance computer

High-performance computer (HPC)

Virtual Ethernet Switch
- Multiplexing of one Ethernet controller
- Communication between partitions

Ethernet switch firmware
- IP/VLAN Routing
- Intrusion detection

Performance computer
- Adaptive AUTOSAR
- Adaptive AUTOSAR
- Classic AUTOSAR

Safety / gateway (e.g. ST SPC5)
- Classic AUTOSAR
- ASIL-D

Virtual Ethernet Switch
- vEth
- vEth
- vEth

Ethernet controller

CANFD controller
Get in touch!

Jiaran.Gao@elektrobit.com
www.elektrobit.com