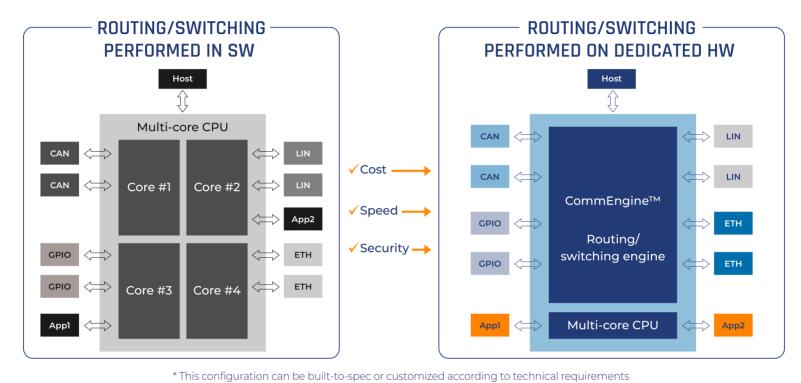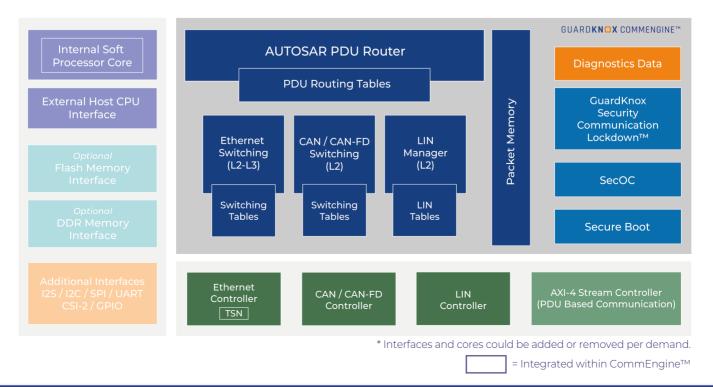# GUARDKNOX COMMENGINE™

INTRO

The GuardKnox CommEngine™ implements Zonal Gateway functionality and enables secure, high-performance and cost-effective data routing. It is available in different versions as highly integrated IP Cores, running on suitable target FPGAs or ASIC. The secure-by-design routing technology allows deterministic ultra-low latency with multi-gigabit bandwidth implemented in hardware to enable next generation automotive E/E architectures.

* This configuration can be built-to-spec or customized according to technical requirements

KEY FEATURES

- Enables switching and routing of common automotive protocols (CAN, CAN-FD, CAN-XL, LIN, ETH, incl. L5 AUTOSAR PDU Router)

- Interface with optional additional FPGA/ASIC logic (external to the CommEngine™) through AXI-4 stream standard interface

- Flexible solution due to configurable routing tables generated by the included tool (such as from ARXML or other formats)

- Real-time bit-level, deep-packet and context-based communication inspection/verification, firewall features, and encryption acceleration implemented in HW

- Up to 10Gbit/s of bandwidth + optional TSN support in FPGA/ASIC implementation

- Supports standard serial interfaces like SPI, I2C, I2S, UART, and CSI-2 in FPGA/ASIC implementation

- Optional support for custom interfaces using professional services (e.g. wheel sensors)

* Interfaces and cores could be added or removed per demand.
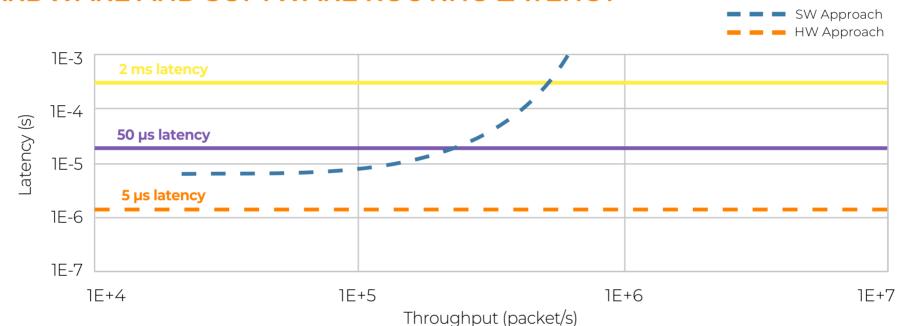
☐ = Integrated within CommEngine™

PRODUCT USE CASES

Zonal Gateway – The CommEngine™ IP handles routing between low-speed and high-speed interfaces, AUTOSAR PDU routing, sensor streaming, security, and multi-gigabit switching in next-generation Zonal E/E Architectures. Additional cores can be added for specific application acceleration needs. Such as pre-processing of sensor data streams (e.g. video and radar).

HPC – CommEngine™ IP integrated in HPC (High Performance Compute ASICs) as the routing backbone in the vehicle.

Central Gateway – CommEngine™ implementation for vehicles with one central gateway. The CommEngine™ integrates all in-vehicle security aspects while fulfilling latest regulatory requirements (e.g., for UNECE R155). See GuardKnox's secure gateway product for more information.

Sub-Zonal Gateway – CommEngine™ IP implementation targeted at local data aggregation (CAN, LIN, sensors, I/O) into a single upstream interface (Ethernet) such as a door module.

HARDWARE AND SOFTWARE ROUTING LATENCY

Legend:
- --- SW Approach
- --- HW Approach

Chart: X-axis "Throughput (packet/s)" from 1E+4 to 1E+7. Y-axis "Latency (s)" from 1E-7 to 1E-3.
- 2 ms latency
- 50 µs latency
- 5 µs latency

KEY BENEFITS

- **Guaranteed throughput -** Routing capacity orders of magnitude higher than what is possible in software guarantees deterministic routing performance even under worst-case load scenarios. The superrior routing capacity enables new features such as complex noise canceling applications and routing even critical ADAS relevant signals like wheel sensor pulses through Zonal Architecture.

- **Reduced cost with improved performance -** Integration into one chip or IP core reduces the number of required IC's, reducing cost without limiting scalability and functionality. No time-consuming and complex vehicle network optimizations are required for deployment.

- **Increased flexibility -** Increased flexibility (e.g., ports, protocols) in early stages through FPGA implementation without long and complex redevelopments (e.g., switch to another MCU/MPU platform). Additionally routing tables can be easily updated via ARXML upload.

- **Straightforward transition -** Completely synthesizable to any ASIC or FPGA technology per vehicle requirements.

Contact us at **info@guardknox.com** to learn more about the GuardKnox CommEngine™