

GUARDKNOX INTRODUCTION

November 2023



GUARDKNOX INTRO



WHO IS GUARDKNOX:

GuardKnox is an AutoTech company **developing products** that address the key challenges in the next-generation of E/E architecture and enable the software-defined vehicle

*E/E: Electrical / Electronic Vehicle System Architecture



WHAT WE DO:

GuardKnox Develops:

- 1) Advanced Secured Service Oriented Architecture (SOA) software inclusive of a Core framework, modules, and development tools.
- 2) Ultra-fast secure PDU routing IP cores (FPGA and ASIC-ready CommEngine) for the next generation of E/E architecture.

GUADKNOX HAS SIGNIFICANT MARKET TRACTION WITH KEY INDUSTRY PLAYERS

Select Engagements and Partnerships



Current Investors



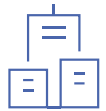
Representative Board Member Experience



KEY GUARDKNOX FACTS AND FIGURES



Global Footprint



Founded in 2016



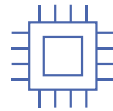
Headquartered in
Tel Aviv, Israel



Subsidiaries in Munich
(Germany), Detroit
(United States),
planned subsidiary in
Asia (Japan)



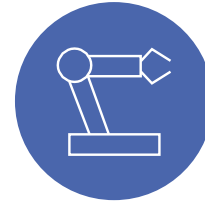
Trends that GuardKnox is Catering to:



Enable high through-
put and low routing/
switching latencies in
zonal architectures



Facilitate OTA- and
dynamic software
updates through a
comprehensive
software lifecycle
management



Industrialization Know-How



28+ global patents
held by GuardKnox



Member of eSync
Alliance and
AUTOSAR consortium



Strategic partnerships
with Aptiv, Lattice,
NXP, WindRiver
and Xilinx



Highly Experienced Workforce



85 FTEs
with >60 FTE in R&D



87% of R&D employees
have 5 yrs experience or
more; mgmt. team has
over 20 yrs experience



100% of software and
firmware development
covered in-house

GUARDKNOX IS PIONEERING NEW TECHNOLOGY SINCE 2016

Foundation of GuardKnox

Moshe Shlisel, Dionis Teshler and Idan Nadav founded GuardKnox with a focus on cybersecurity technology



Startup Autobahn

Joined StartUp Autobahn powered by Plug & Play Accelerator and collaborated with Porsche, Daimler and DXC



Patents Granted

Patent US 10,009,350, Patent US 10,055,260 and Patent US 10,129,259; additional ones early in 2019

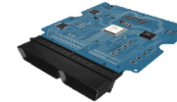


GuardKnox Domain Controller Unit

Introduction of DCU to enable domain E/E architecture



Partnered with CAROTA to use GuardKnox' Communication Lockdown Tech for CAROTA's OTA product



GuardKnox CommEngine

Introduction of a routing solution that enables the move to a zonal E/E architecture

Closed \$25m Series B round

Closed \$25M round, led by Vektor Partners with pre-money valuation of \$220M



GuardKnox SOA Framework

Introduction of a middleware software supporting continuous software deployment



Soonicorn Status

GuardKnox awarded Soonicorn 2023 by Tracxn



\$3M Seed round

Raised from local Israeli investors: Cyphertech, Allied and Kardan



GuardKnox Secure Network Orchestrator

Introduction of first internal and external Network Orchestrator



Partnership with Xilinx

Focus on Field Programmable Gate Array ("FPGA") hardware



\$21M Series A Round

Raised from Faurecia, SAIC, Glory Ventures, Plug and Play, VectoIQ, NextLeap Ventures and others



Founded Subsidiaries in USA and Germany

Expansion of global presence by opening office in Munich and Detroit



Partnership with NXP and Greenhill Software

Focus on the development of automotive Service-Oriented Architecture ("SOA")



Joining the AUTOSAR Consortium

Built further ties to the leading consortium



Partnership with Aptiv

Partnership to move CommEngine further towards market readiness and production



Partnering with eSync Alliance

Partnered to join the effort to establish a global standard for OTA updates



GUARDKNOX IS WELL POSITIONED TO BRING PRODUCTS TO MARKET AND DRIVE THE NEXT WAVE OF GROWTH



Deep Technological and Automotive Expertise

Broad technological expertise in **software and firmware development** and cybersecurity originating from the **IDF, IAF** and years of experience in **automotive companies** - further supported by a **board of high-profile industry veterans**

AUTOSAR

ETAS



MARVELL

SAMSUNG

escrypt
SECURITY. TRUST. SUCCESS.



MAGNA



Mercedes-Benz



Strong Customer Centricity and Future Directed Thinking

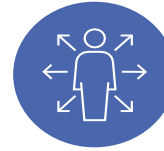
Focusing on the **customers needs**, understanding them, and **anticipating** them is part of GuardKnox's nature and key paradigm in execution



I've never met such forward looking and dedicated minds that are trying to anticipate the OEM's future needs already right now

VP of Advanced Technology and Architecture

• APTIV •



Robust Global Footprint

Embedded in the **start-up ecosystem** of Tel Aviv giving access to **state-of-the-art research** and a highly skilled talent pool, while having a **global footprint** in the **US and Germany** - Asia branch following soon



Secured Intellectual Property Assets

Developed portfolio of **28+** European, US, Chinese, Japanese and Korean patents; **additional patents in preparation**

IMPRESSIVE MANAGEMENT TEAM WITH THE NECESSARY TECHNICAL EXPERTISE



Moshe Shlisel⁽¹⁾

CEO & Founder

Moshe founded GuardKnox after gaining firmware and software product development experience in the Israeli Air Force and several executive positions with large high-tech corporations and start-ups.

Moshe holds a MA in Economic Policy from Tel Aviv University and B.Sc. in electro-optics from Technion University.



Joe Romeo

Managing Director of GuardKnox USA

Joe has 23 years of experience as an engineering and business leader, holding roles in Engineering and Financial Management at Ford and Sales, Business Development and Engineering Management at Bosch.

Joe holds a Masters in Mechanical Engineering from Cornell University and an MBA from the University of Michigan Ross Graduate School of Business.



Dr. Knut Sauer

Group CTO & Managing Director of GuardKnox Europe

As an accomplished technology leader, Knut combines 25 years of R&D, engineering and entrepreneurship with the passion to build with his own hands. Apart from his deep technical expertise, the ability to convey vision and excitement to clients, investors, and employees is his biggest personal and professional asset.

He received a Ph.D. in Computer Science from Imperial College graduating summa cum laude and an Executive MBA from the London School of Economics.



Jillian Goldberg⁽¹⁾

CRO

Jillian brings to GuardKnox her experience in board management, partnership creation, innovation, business development and marketing, as well as risk mitigation. She began her professional career as an inner-city public high school science teacher and is an executive board member at the Nevo Network, a professional development support network for immigrants in tech.

Jillian received her BA from Tulane University and holds a Masters of Public Health in Emergency and Disaster Management from Tel Aviv University.



Anat Susan Solomon
CFO, Tel Aviv

Anat was previously the CFO at EDF Renewables and a Finance Manager at GE.



Jamey Cates
CTO, USA

Jamey is a licensed and accredited professional software engineer. He has 20+ years of experience developing cutting edge solutions for commercial automotive, and military customers.



Amy Kirshon
VP of R&D, Tel Aviv

Amy has held various management roles within Engineering and R&D in the fields of Aerospace, Satellite Communication and Defense.



























Note: (1) Board Director

GUARDKNOX'S BOARD IS COMPRISED OF HIGH-PROFILE INDUSTRY VETERANS

Overview of Board of Directors and Board of Advisors

Board of Directors Advisory Board

 <p>Dr. Paul Achleitner</p> 	 <p>Dr. Jurgen Hambrecht</p> 	 <p>Peter Loescher</p> 	 <p>Dr. Kurt Lauk</p> 	 <p>Michael Diekmann</p> 	 <p>Dr. Roland Berger</p> 
 <p>Steve Girsky</p> 	 <p>Mark Norman</p> 	 <p>Saeed Amidi</p> 	 <p>Mary Chan</p> 	 <p>Mj. General Avihu Ben Nun</p> 	 <p>Shay Livnat</p> 

Current Investors

	
	
	
	
	
Board Members⁽¹⁾	

Note: (1) Board members are investors in GuardKnox

MORE THAN 60 HIGHLY SKILLED SOFTWARE AND FIRMWARE ENGINEERS ARE WORKING FOR GUARDKNOX

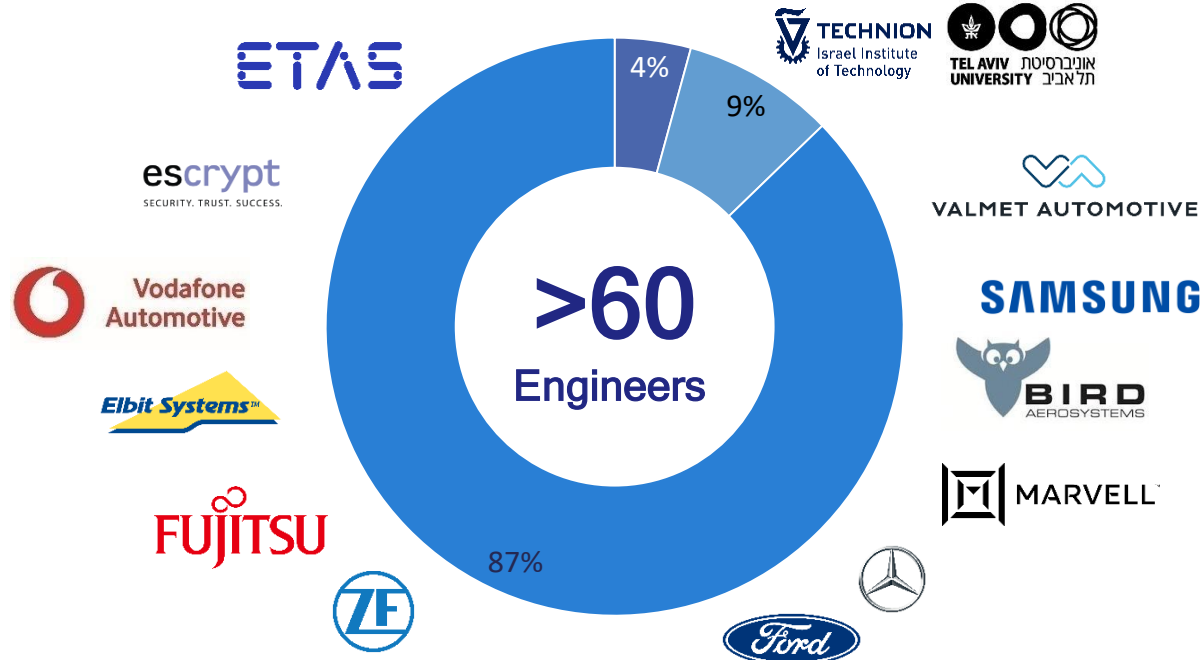
Professional experience of engineers ■ Junior (<3y) ■ Professional (3-9y) ■ Senior (9+y)

+207%

Increase in R&D FTEs from YE21 to 08/22

+108%

Increase in total FTEs from YE21 to 08/22



Their research and striving for innovation has resulted in ...

28 Patents¹

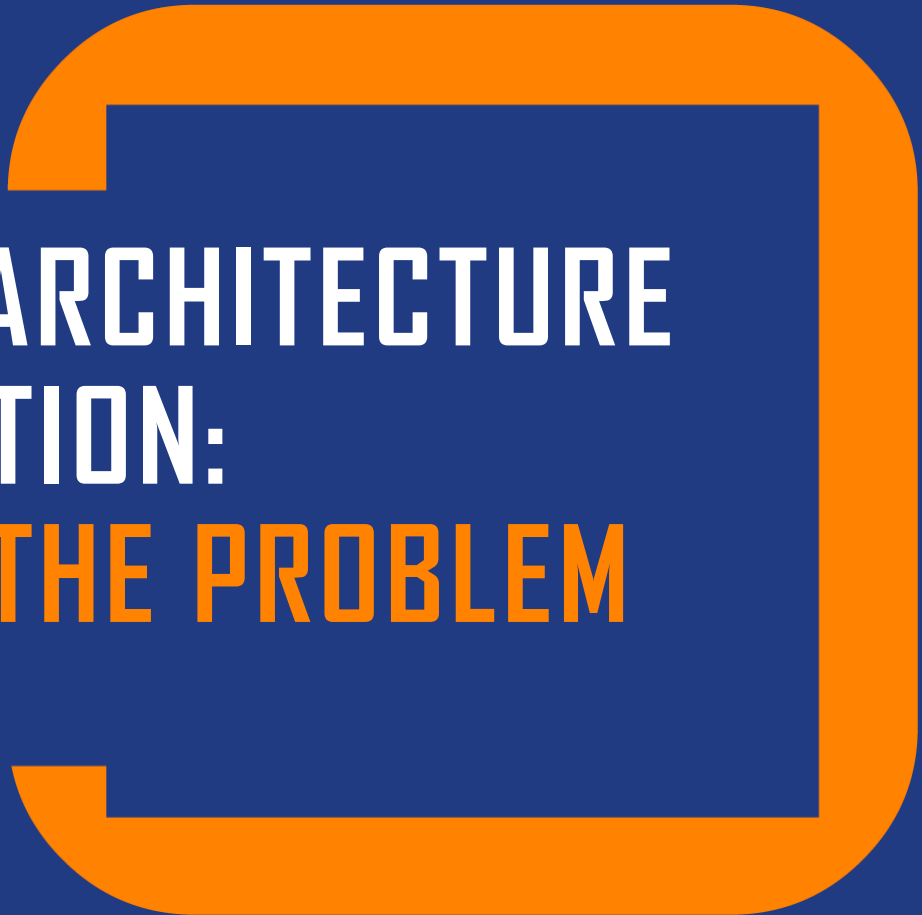


- Lockdown Methodology (Patent 9,899,533)
- Secure hardware architecture (Patent 10,009,350)
- Service-Oriented Architecture (SOA) for vehicle ECUs (Patent 10,055,260)
- SOA ECU Architecture (Patent #10,776,169)
- Distributed SOA (Patent 10,191,777)

... Patents published/granted for EU, USA, China, Korea and Japan



Engineering experience critical to E/E architecture hardware as well as Service Oriented Architecture software development is strongly established within GuardKnox



E/E VEHICLE ARCHITECTURE TRANSFORMATION: ADDRESSING THE PROBLEM

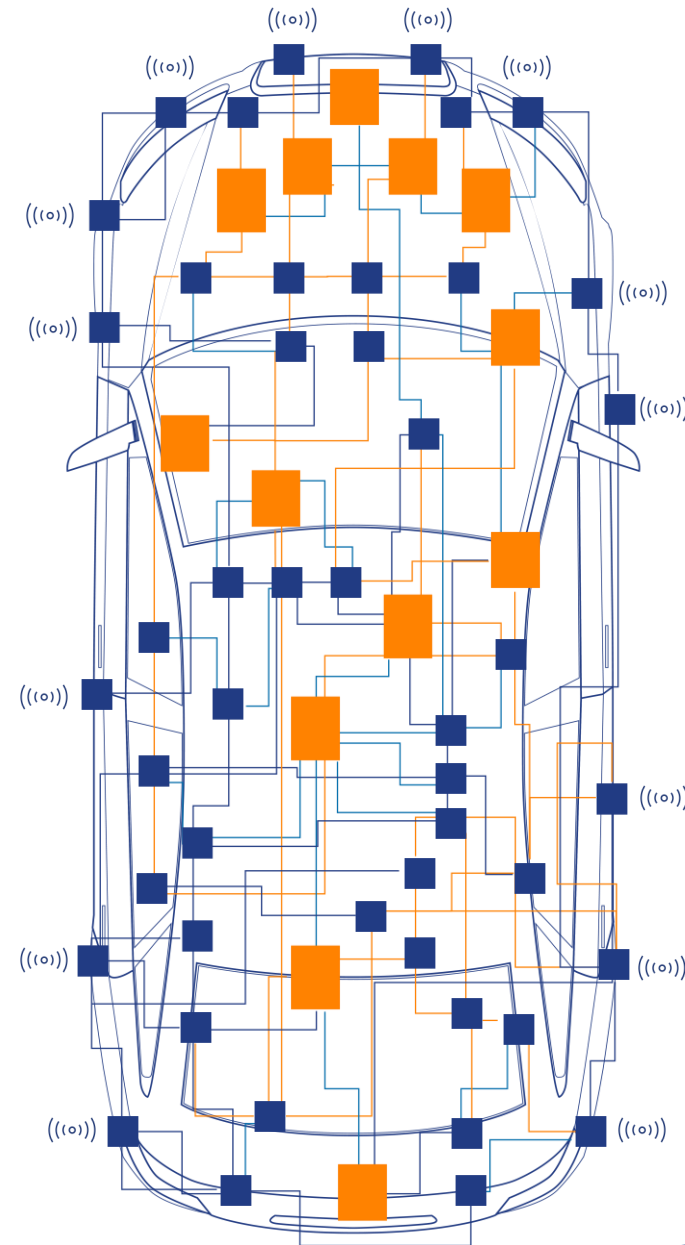
THE AUTOMOTIVE INDUSTRY IS SHIFTING TO SOFTWARE-DEFINED VEHICLES

Today vehicles have anywhere from 50-150 ECUs. For many reasons this is **not sustainable**:

- Inflexible
- Complex
- Costly
- Lacking in security
- Hard limit in scalability & innovation

Time to market must be measured in weeks, not years.

Costs and complexity need to come down for vehicles to enter the era of the software-defined vehicle.



WHAT IS THE SOFTWARE-DEFINED VEHICLE?

A futuristic car is shown in profile, facing right. The left side of the car is a solid, dark blue wireframe. The right side is a glowing orange wireframe, with a bright orange light beam shining down on it from above. The background is dark blue with some light effects.

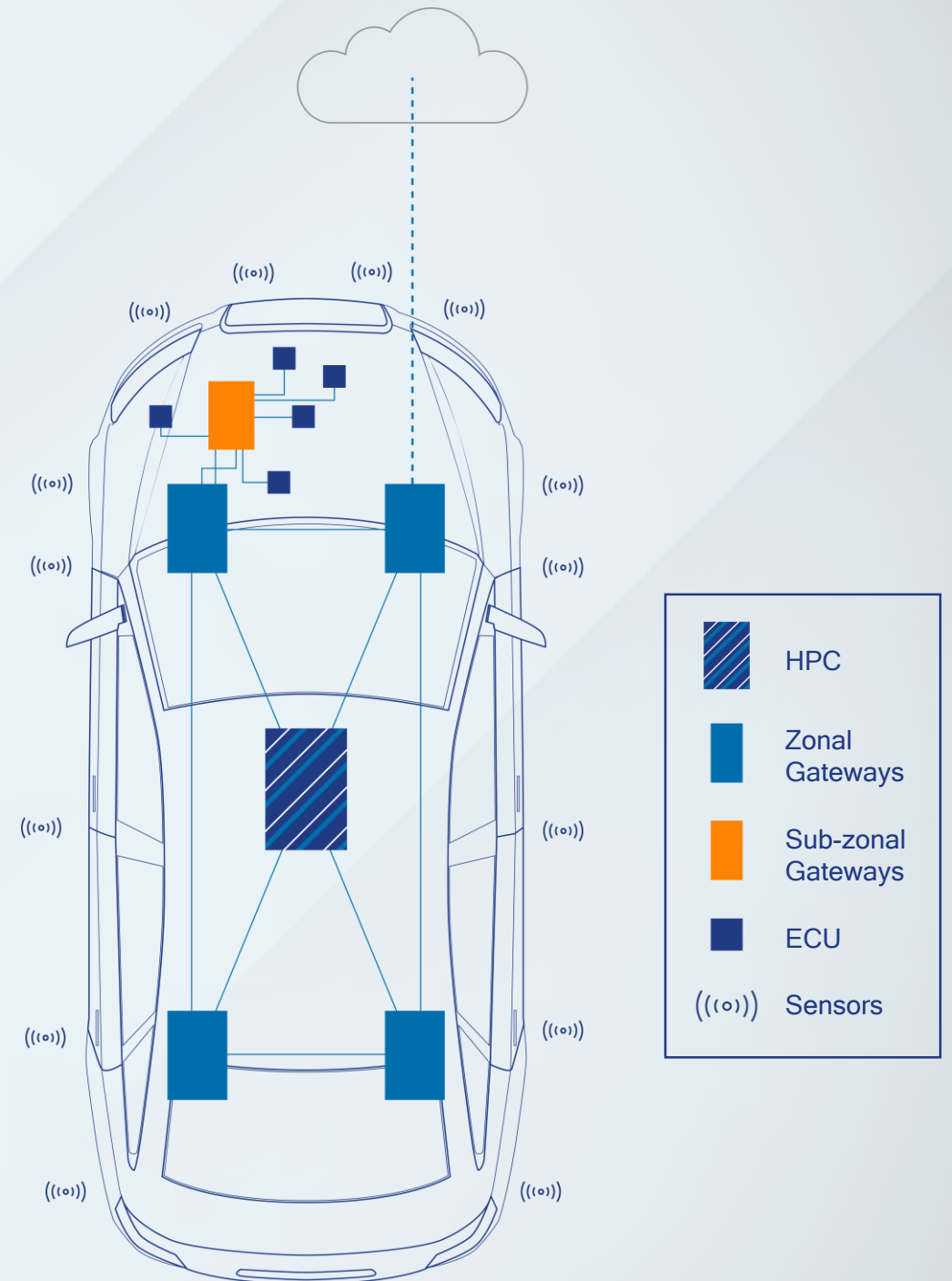
A VEHICLE WHOSE FEATURES AND FUNCTIONS ARE PRIMARILY ENABLED THROUGH *SOFTWARE*, A RESULT OF THE ONGOING TRANSFORMATION OF THE AUTOMOBILE FROM A PRODUCT THAT IS MAINLY HARDWARE-BASED TO A SOFTWARE-CENTRIC ELECTRONIC DEVICE ON WHEELS

THIS SHIFT REQUIRES A NEW E/E ARCHITECTURE

To offer a unique and driver-centric experience, the new vehicle needs to be:

- Fully flexible
- Completely connected
- Customizable
- Secure
- Has less wiring
- Is powered by a handful of HPC/central computers
- Uses high speed Ethernet protocol

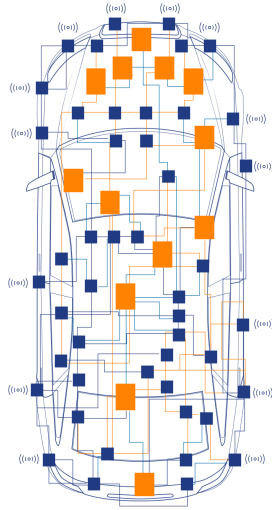
This can only be done with next generation (Zonal) architecture



TODAY'S E/E ARCHITECTURES CANNOT SUPPORT SOFTWARE-DEFINED VEHICLES...

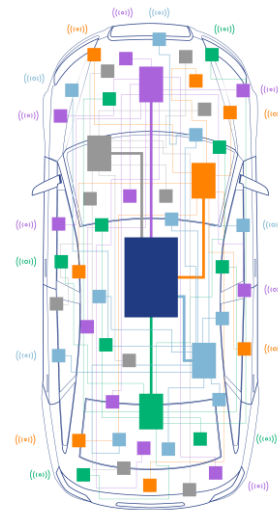
Traditional Vehicle Architecture

LEGACY



Distributed Architecture

>150 ECUs

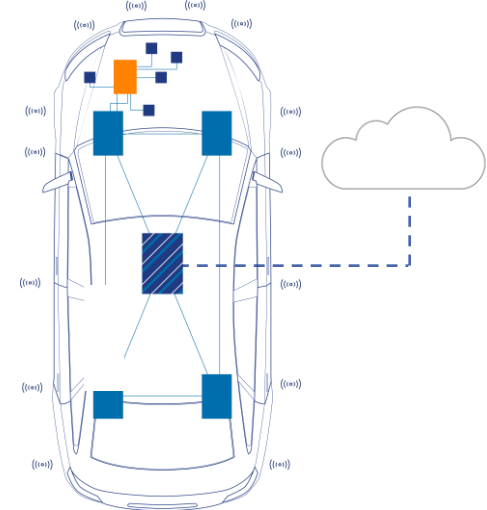


Domain Architecture

5-7 DCUs



ZONAL



Centralized Architecture

1-2 HPCs

Zonal Architecture provides additional service capabilities as OTA updates at lower BOM costs

Market Examples⁽¹⁾



Note: (1) Includes OEMs who have announced their plan to utilize Zonal architecture but are not yet in the market

...THAT OPENS THE PATH TO SERVE GROWING MARKETS

GUARDKNOX IS WELL POSITIONED TO TAP LARGE, NEW FORMING REVENUE STREAMS

Supporting Market Trends

Global Shift Towards Digitalization of Vehicles

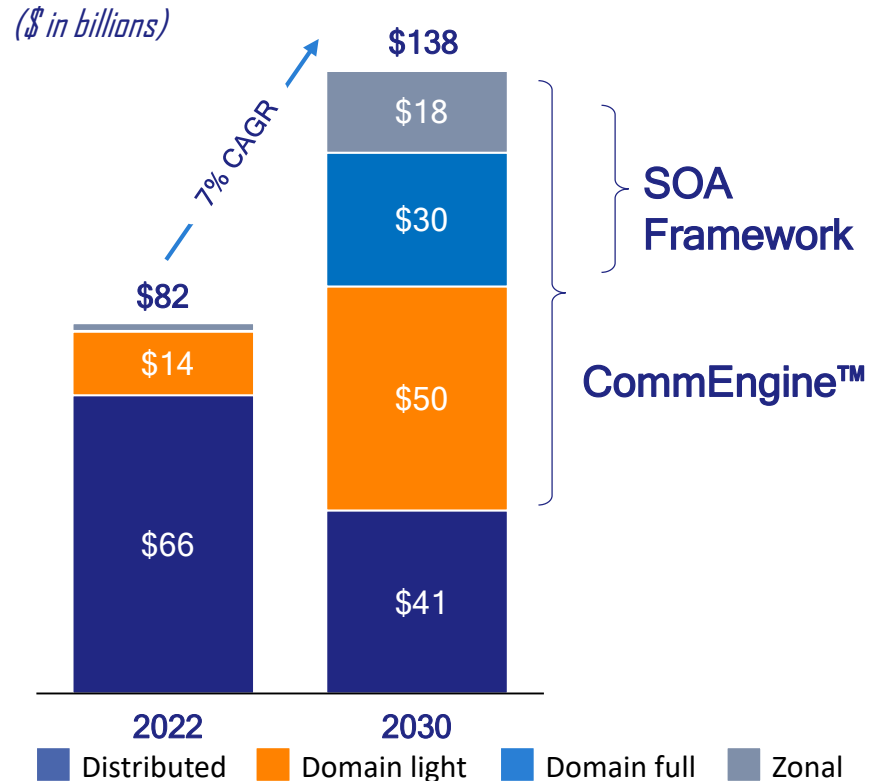
Decreasing Complexity of Wiring Harness

Rising OEM Demand for Secure OTA Updates

Decoupling of Hardware and Software

Lifetime Monetization of Vehicle

Projected Market Size of Control Units



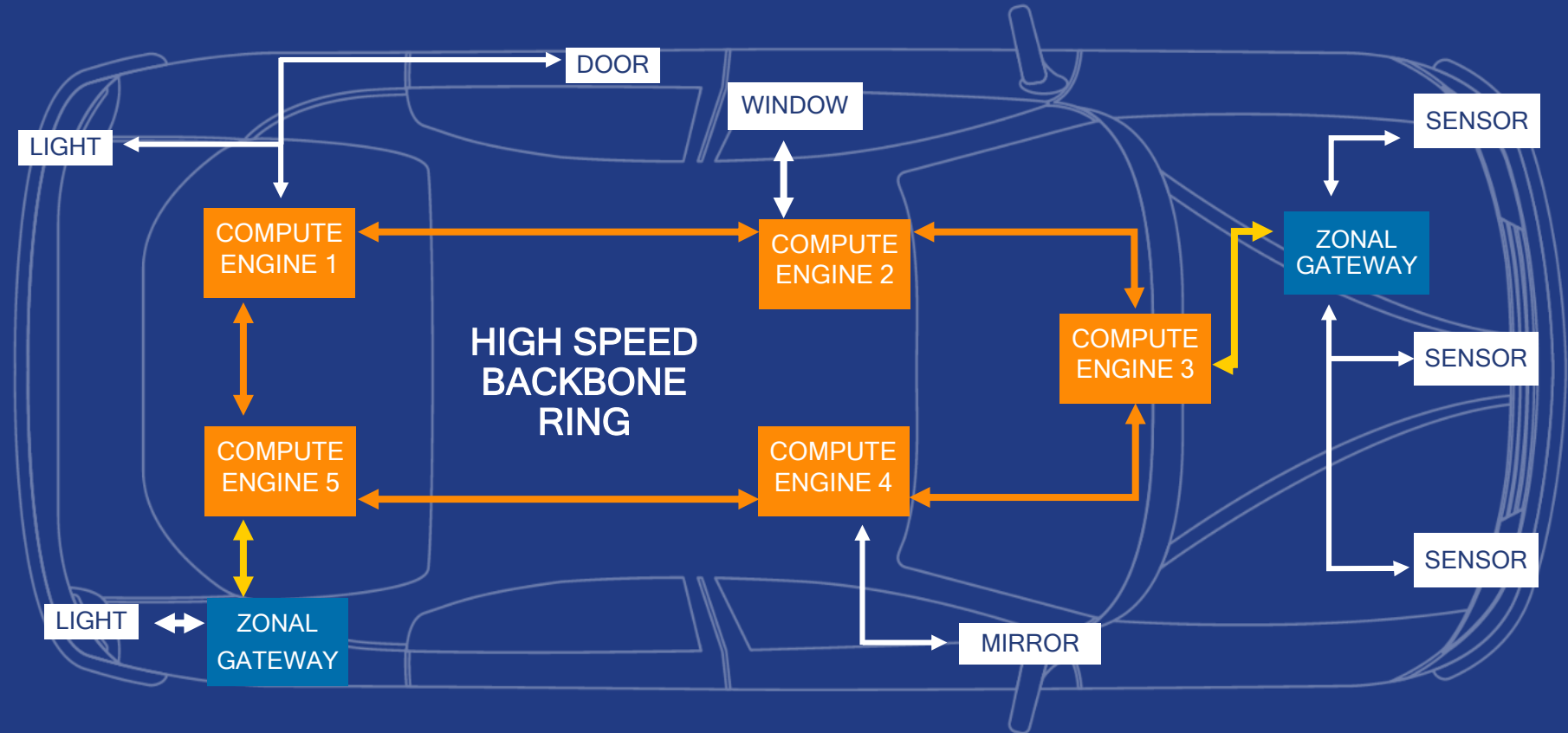
GUARDKNOX'S
RAPIDLY EXPANDING
MARKET IS
EXPECTED TO
REACH

\$138B

PER YEAR BY 2030

ZONAL ARCHITECTURE IS THE FIRST E/E CONCEPT DESIGNED MAINLY FOR COST SAVINGS

“**E/E Zonal Architecture**” is a concept that reflects the technological shift, that addresses the increasing complexity and computational demands of the automotive **electronic/electrical (E/E)** system to meet the expectations of the new generational automotive consumer and industry trends.



GAPS BETWEEN PRESENT AND FUTURE: THE E/E ARCHITECTURE

01 Drawbacks in Communication Efficiency

- Need for higher communication efficiency
- Need for greater bandwidth capacity
- Need for ultra low latency
- Ability to work between multiple communication interfaces

02 Constraints in Computing Power

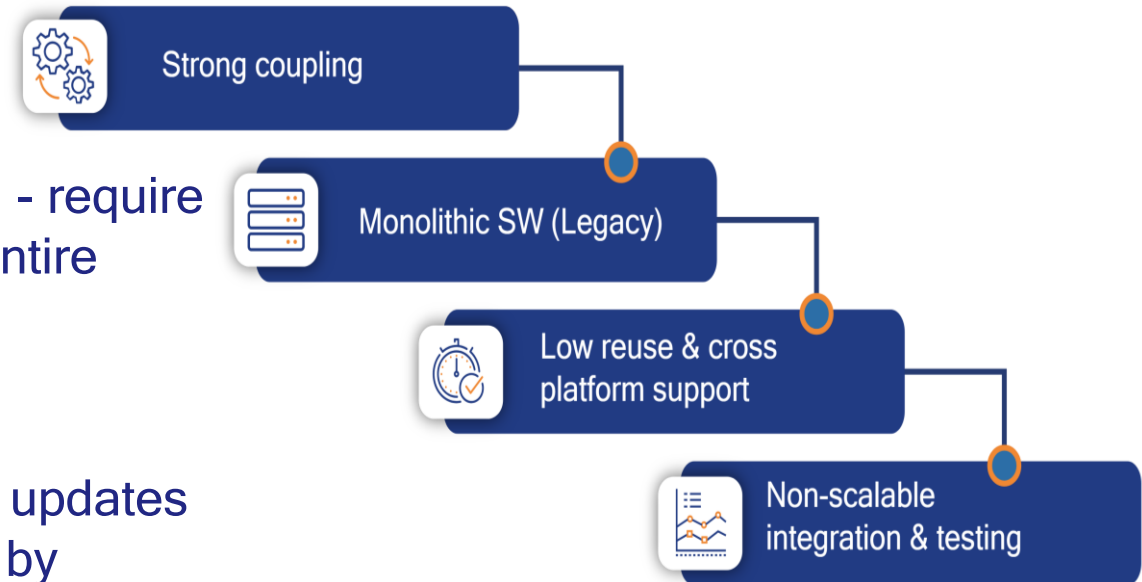
- Higher demand for data processing and computing speed

03 Uncontrolled Cost of Wiring Harness

- Wiring harness weight and layout costs
- Cost of actual wiring (especially as we move to ADAS)

AUTOMOTIVE SW ARCHITECTURE TODAY

- Software is distributed over 100+ Electronic Control Units (ECUs) per vehicle.
 - High complexity.
 - SW and HW coupling.
- Monolithic blocks of code are difficult to maintain - require re-integration, re-testing, and re-flashing of the entire system for every change.
 - Extremely tedious and costly.
- Cumbersome customer customization. Software updates or aftermarket enhancements must be deployed by authorized dealerships.
 - Typically requires physical access to the vehicle and high costs.



Costs a lot of money, and creates long development cycles, in the ability to be relevant to customers' needs regarding time.



GUARDKNOX PRODUCTS

THE DOOR IS OPEN FOR GUARDKNOX'S SOLUTION TO ADDRESS THE NEXT GENERATION OF E/E ARCHITECTURE

SOA Framework

Automotive software middleware and developer tool suite to orchestrate software components for all automotive domains along the entire software lifecycle

CommEngine™

Ultra-fast, multi-protocol firmware (IP core) for a comprehensive secure automotive routing and switching solution

AUTOMOTIVE TECHNOLOGY STACK

Human-Machine Interface

Automotive Application

Operating Software & Middleware

Electrical / Electronic Hardware

Sensors

Actuators

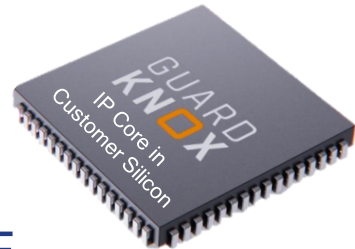
GUARDKNOX'S TECHNOLOGY IS THE KEY BUILDING BLOCK TO MEET AND EXCEED CUSTOMER DEMANDS IN AUTOMOTIVE CAPABILITIES

...THROUGH INNOVATIVE PRODUCTS AND ATTRACTIVE PARTNERSHIPS... AUTOMOTIVE E/E PRODUCTS FOR SOFTWARE-DEFINED VEHICLES

TECHNOLOGY OVERVIEW

COMMENGINE™

Ultra-fast, multi-protocol firmware (IP core) accelerator built to overcome the in-vehicle network changes in the transition to new E/E architectures



SOA FRAMEWORK SUITE

Comprehensive software lifecycle management product for the next generation of software-defined vehicles addressing all automotive domains while reducing time-to-market



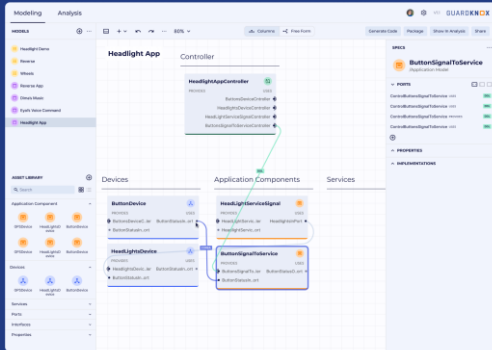
SOLUTIONS FOCUSED ON ENABLING NEXT GENERATION E/E ARCHITECTURES

SELECT ENGAGEMENTS AND PARTNERSHIPS

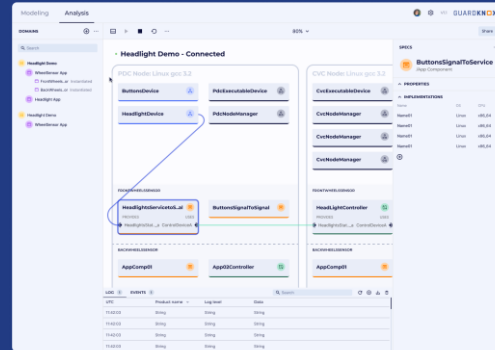
• APTIV •



SOA FRAMEWORK SUITE: FULL SOFTWARE LIFECYCLE MANAGEMENT & STREAMLINED SOFTWARE DEVELOPER TOOL SUITE



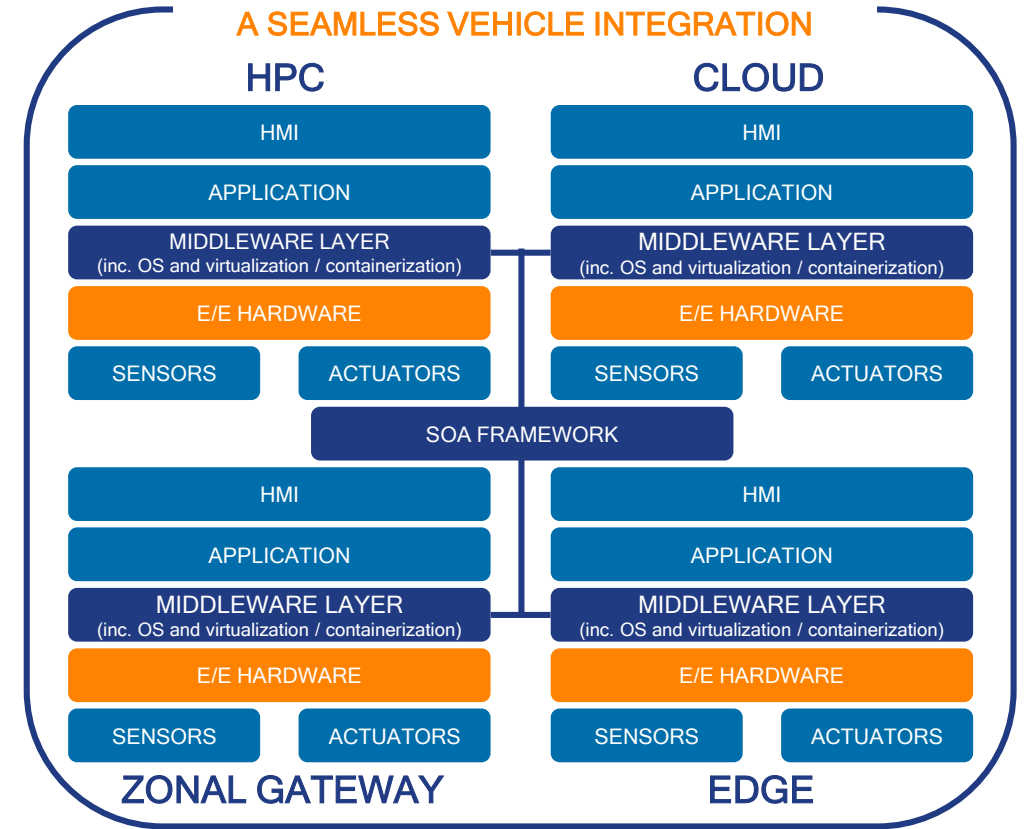
MODELING TOOL



ANALYSIS TOOL

- Improve asset reuse for faster development times and lower costs
- Shorten time-to-market for updates and new services
- Increase team collaboration across geographies

ONE APPLICATION ON ALL MACHINES FOR
A SEAMLESS VEHICLE INTEGRATION



CORE FRAMEWORK

- Software and hardware abstraction allows for the reuse of software components
- Full lifecycle management for software components (via standard APIs) reduces development time, allowing for increased focus on new solutions
- Creates new revenue stream opportunities for OEM and Tier 1 suppliers (via services)

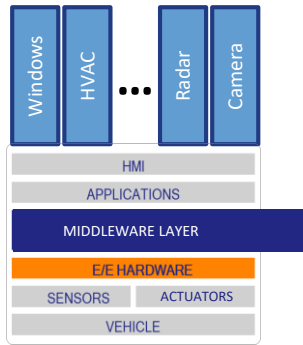
GUARDKNOX'S SOA FRAMEWORK CONNECTS ALL MACHINES

ONE APPLICATION FRAMEWORK ON ALL MACHINES FOR A SEAMLESS VEHICLE INTEGRATION

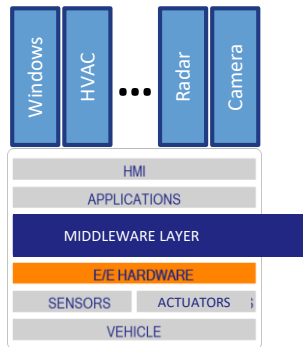
SOA FRAMEWORK BENEFITS

- 1 Provides platform and application separation
- 2 Platform and application lifecycle management
- 3 Unified service-oriented communication
- 4 Health monitoring and management
- 5 Cross-platform security
- 6 Dynamic Software deployment and distribution

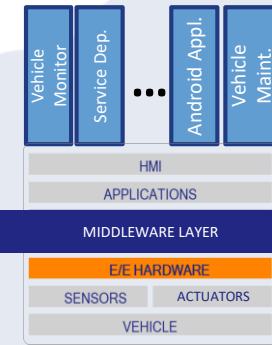
HPC



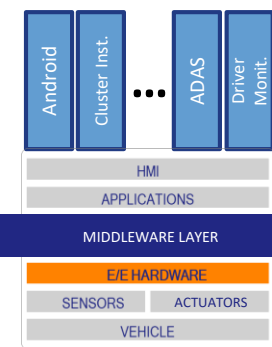
ZONAL GATEWAY



CLOUD



V2X



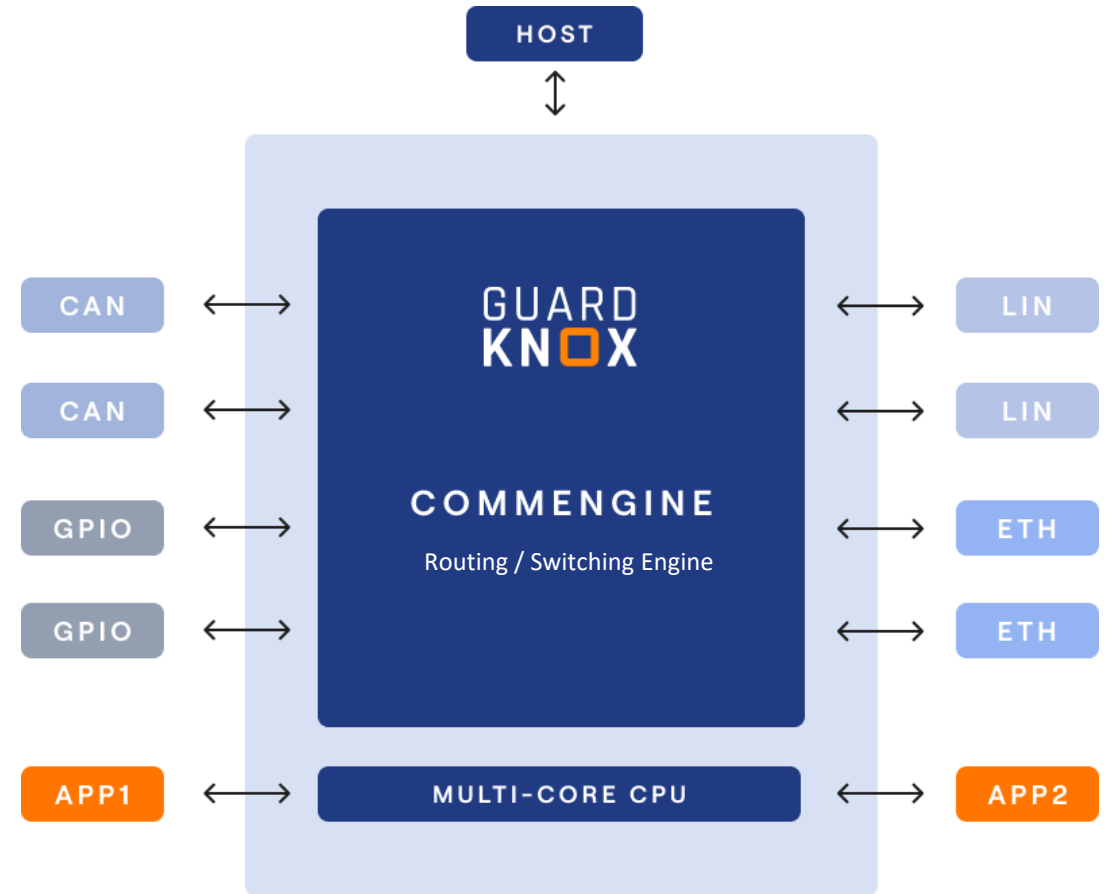
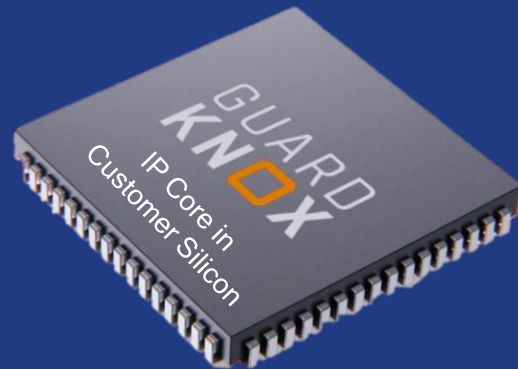
COMMENGINE: FAST, SECURE, FLEXIBLE ROUTING & SWITCHING

The CommEngine is a firmware (IP core) solution that manages all in-vehicle communication switching and routing securely with unmatched speed

Communication latency is 1,000X faster than existing solutions

Ready for implementation as:

- IP Core
- FPGA
- ASIC



- Supports all common & custom automotive interfaces and protocols
- Bit-level and real-time deep packet security inspection

GUARDKNOX GATEWAY: ENABLING REGULATORY COMPLIANCE TO UNECE R155

REGULATION

UNECE R155⁽¹⁾: Regulation mandates that all OEMs ensure cybersecurity is embedded in all vehicles produced starting July 2024.



GUARDKNOX'S SOLUTION

GuardKnox's new secure gateway is an automotive ECU that secures and monitors in-vehicle communication in real-time, maintaining connectivity and bandwidth.

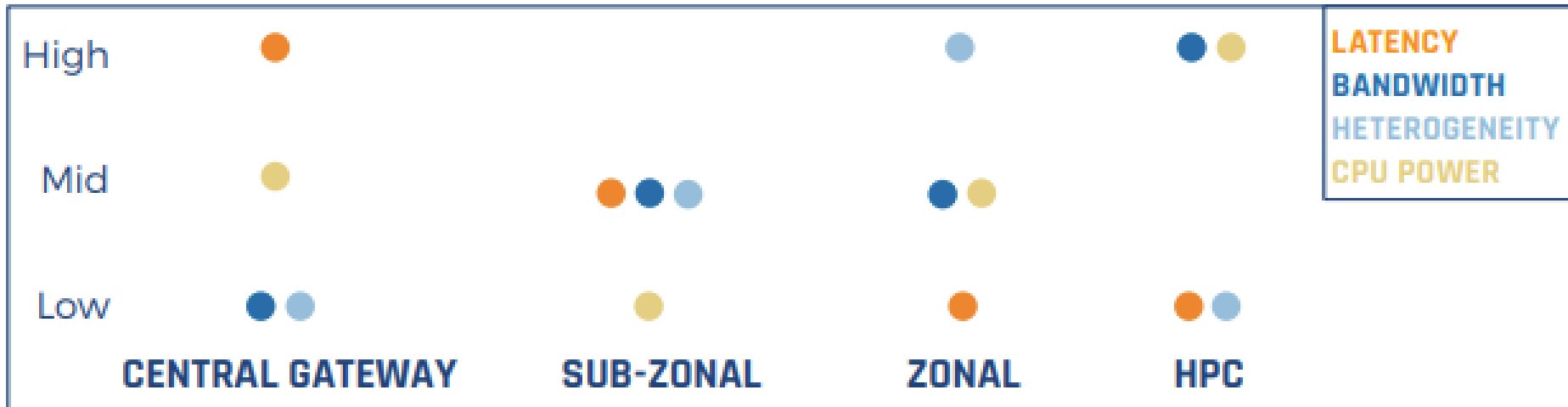
The gateway gives evidence for OEMs to **prove compliance with UNECE R155's** vehicle cybersecurity requirements.

(1) United Nations Economic Commission for Europe Regulation No. 155

GUARDKNOX GATEWAY OFFERS FLEXIBLE IMPLEMENTATION FOR DIFFERENT VEHICLE PROJECTS

The gateway technical specifications are flexible enough to provide best-of-breed communication routing latency, throughput, and security as a Zonal Gateway in next-gen architectures and powerful enough to be the main compute for vehicle's using Domain Central Architecture.

MULTIPLE IMPLEMENTATIONS TO FIT ANY VEHICLE



EXPERIENCE FIRSTHAND HOW OUR UNIQUE SOLUTIONS ENABLE THE FREEDOM TO EVOLVE TO THE SOFTWARE-DEFINED VEHICLE WITH THE GUARDKNOX DEMO VIDEO!



Password:
guardknoxdemo888

<https://learn.guardknox.com/guardknoxdemo>

THANK YOU

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