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CYBER SECURITY

In-vehicle network의 사이버 보안

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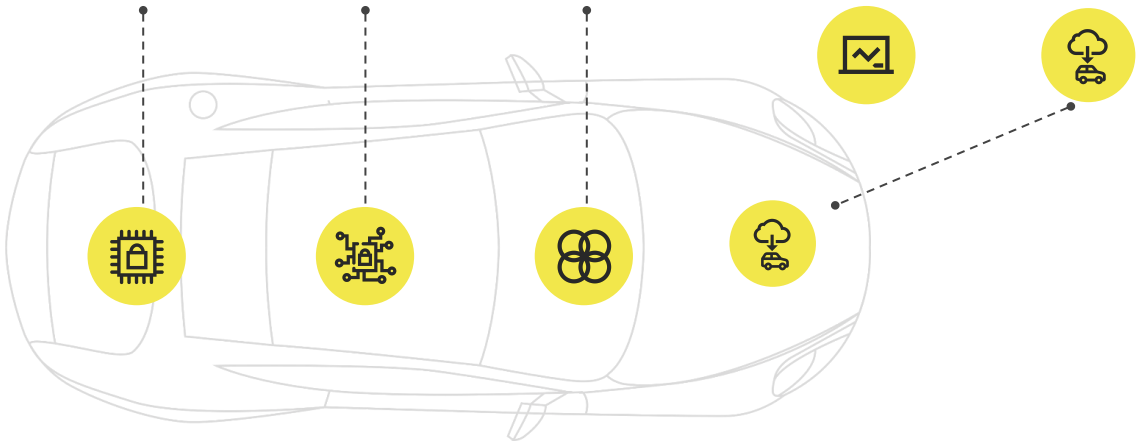
Holistic Offering

IN VEHICLE			OUT OF VEHICLE			SERVICES
Core ECU Protection	Network Protection (CAN/Ethernet)	Connected ECU Protection	Fleet Protection	OTA Software Updates	Vehicle Vulnerability Management	Penetration Testing
						TARA
						Code Review
						Security Concept
						Security Requirements & Specifications
						Incident Response



MAXIMUM SECURITY. GREATER VISIBILITY.

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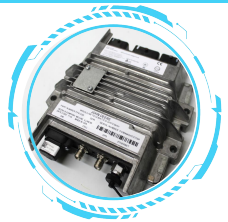
Attack vectors connecting surfaces and end ECUs

V2X



Telematics & Cellular Devices

Bluetooth

WiFi

Infotainment

OBD II

Risky zone

TCU

BLM

IVI

OBD

Central Gateway

Secure zone

Domain Controller

Domain Controller

Domain Controller

ECU

ECU

ECU

ECU

ECU

ECU

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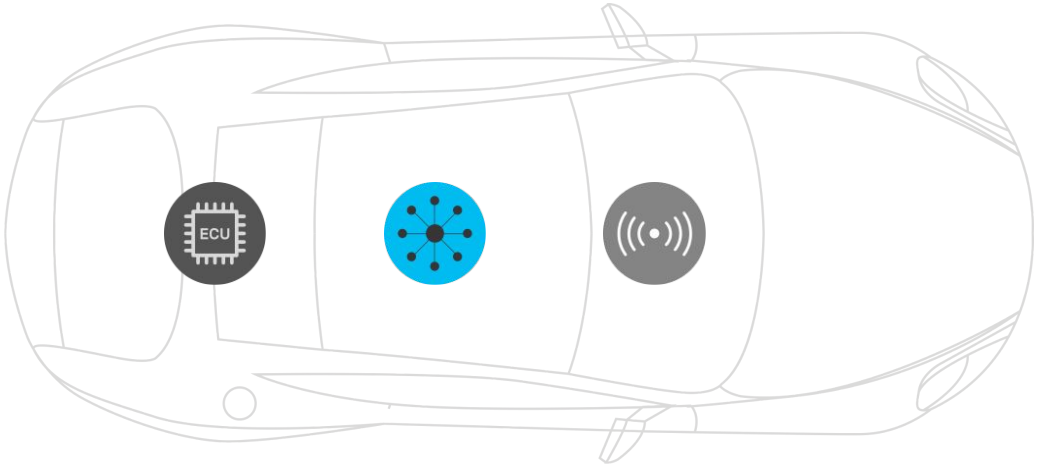
Argus Network Protection

Argus provides network inspection logic designed to run in various platforms



As a Network IDS

Gateways Domain Controllers

Switch

HPC

As a Firewall

Connected ECUs

Endpoint Autosar ECUs

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Argus CAN IDS

Argus CAN IDS

- Software solution, designed for integration on classic Autosar / bare metal ECUs
- Detects attacks based on timing, context and deep packet inspection of CAN communication
- Rule-based
- Developed following extensive research and in-vehicle pen-tests
- Flexibility to support various security needs
- Detection only, Basic prevention only, Reaction approach and more
- Scalable and configurable to change modes in the future
- Ability to pinpoint malicious message, detailed information on each attack detected

Mapping to packages

Frame filtering

Frame Analysis

Diagnostics

Advanced analysis

Covering requirements from Global Regulations:

- **EU/Japan:** UNR 155 Annex 5
- **Chinese:** GB/T 40857 - 2021

Detection rule & Relevant Input

Detection rule of CAN is designed according to various inputs from **CAN DBC** and **Network recording**

CAN IDS Features	DBC Input					Network Recording
	CAN Header	CAN Payload		CAN Bus	Timing spec	
		CAN Data	Higher layer protocols (e.g. ISO-TP, UDS)			
Baseline	○			○		○
Specification Enforcement	○	○	○	○		
Diagnostic	○		○	○	○	○
Timing, Data and Timing	○	○	○	○	○	○

CAN IDS Ruleset

- Contains the vehicle specific security policy
- Easily updated without full firmware update
- Automatic generation process
- Enables modularity by using only specific parts
- Easy to use configuration tool
  - Change the required reaction per attack
  - Add specific rules (can be automated as well)
  - Remove / change parts

Use cases

Customer: Japanese OEM & Japanese Tier-1
Market: Global (Japan/Europe/North America)
Integrated ECU: CGW/C-BCM
Projects: 3 baseline projects +8 variants and still going on

Lessons learned from mass production projects:

- OEM & Tier-1 need more **security advices beyonds IDS**
  - Regulation Compliance check
  - E/EA, ECU Security Consulting
- Tuning for **0 False Positive** and **High Detection Rate** is challenging but mandatory
- **Expertise-Resources of various areas** is necessary to secure a mass production

Types of features implemented

Baseline	Specification Enforcement	Diagnostic	Timing, Timing and Data
• Header Filter • Busload Monitoring	• CAN DPI • Protocol Enforcement	• UDS Header Filter • UDS DPI • UDS DoS • UDS Vehicle Scenario Monitoring	• Frequency Monitoring • Minimal Interval Monitoring • Counter Monitoring

Key Tasks & Expertise-Resources for CAN IDS Production

Administration & Regulation

Regulation Compliance Check
- Regulation Expert

Regulation Compliance Check
- Regulation Expert

Regulation Update Track
- Regulation Expert

Life-time incident response
- P-SIRT
- Vulnerability Management

Planning → **Development** → **Validation** → **After production**

Feature & Deployment Plan
- Automotive Security Expert
- Product Expert

Product Development
- Product Expert

Network Research & Rule design
- Automotive Network Expert
- Security Researcher

Automotive Quality Validation
- ASPICE validator
- Automotive Functional Tester

Automotive Security Validation
- Fuzzing/Pentest Engineer

Continuous Product Improvement
- Product Expert
- Automotive Security Researcher

Engineering

THANK YOU

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