# PEARL Auto

## Secure the electronic system of the connected car using the game-changing embedded Secure Element (eSE).

Connected Objects

**As technology advances, cars are turning from a means of transportation into digital devices on four wheels. However, a vital component of this new driving experience is ensuring that the numerous electronic functions that make up the car's internal electronic system are secure. Today, that component is PEARL Auto— an embedded Secure Element, specifically created for the automotive market.**

**As the car industry and technology evolve, cyberattacks are becoming a real issue. This means that the need to secure the car's electronic systems is a no-brainer.**

### Our offer

PEARL Auto Operating System combines the best of hardware and software, thereby providing cryptographic services with a much higher security level than software-based solutions.

The electronic system of the car is made up of one Telematic Control Unit (TCU) and several Electronic Control Units (ECUs), each one controlling a different function of the car (doors, lights, brakes, etc.). PEARL Auto, a state-of-the-art security product, is a cryptographic toolbox based on a tamper-proof chip. Embedded in the car's TCU/ECUs, it **guarantees software and data integrity**. Essentially, it provides everyone from the driver to the OEM with the genuine peace of mind that no outside manipulation of the car's electronic systems were done, apart from the legitimate updates coming for the car maker.

PEARL Auto also **creates a trusted link between the car and Cloud services,** so that third parties can deploy secure services.

## Why IDEMIA?

With billions of chips deployed worldwide over 25 years, IDEMIA has forged its know-how in secure embedded OS development, unique expertise in cryptography, security certifications and secure personalization.

Our range of embedded products (PEARL Consumer, IoT, Auto) addresses different market verticals, but always uses the same eSE secure core technology. Simply put, PEARL Auto guarantees software integrity, secure storage in a tamper-proof chip and confidentiality of exchanges over the air..

## Benefits

### Highly secure

PEARL Auto Operating System combines the best of hardware and software cryptographic services.

### Trustworthy

The highly secure eSE reassures drivers that when they start their car, all electronic systems are go.

### End-to-End Solutions

Thanks to our extensive experience with eSIMs, keyless access and biometrics, we offer comprehensive solutions for the automotive market.

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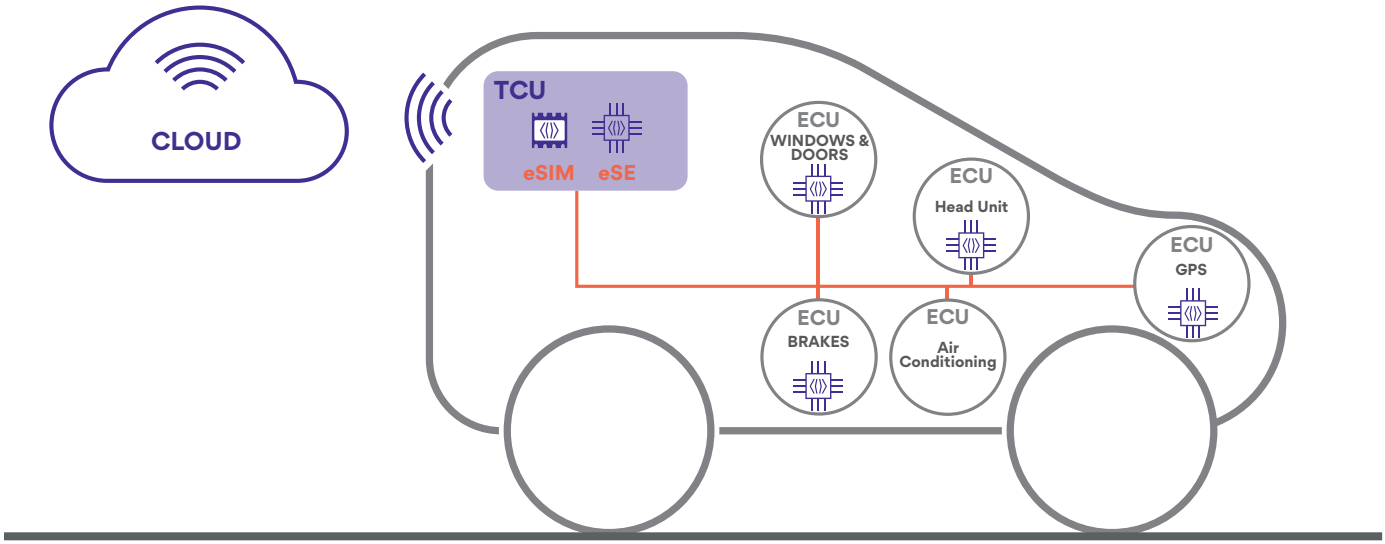
# How it works?

When the car is turned on, the **secure boot function** kicks in. PEARL Auto scans all the internal software of the TCU and/or ECUs in which it is built, making sure no external modifications occurred to the firmware. If PEARL Auto repeatedly detects an anomaly within the system, the module is blocked, preventing cyberattacks from reaching their goal. This same technology also applies to ECU/TCU **firmware update** verifications, done locally or Over-The-Air (OTA).

When verification is complete, the TCU establishes a **secure communication with the cloud thanks to secure storage capabilities** for keys and PKI certificates and **protection of driver-related information** (e.g. location) through strong data encryption and decryption (AES, RSA/Elliptic Curves).




# Cutting-edge technology

- Secure storage: 350 KBytes of memory for OEM and driver's data
- Secure boot and secure firmware updates
- Secure 32bits RISC core (CC EAL5+ & EMVCo certified)
- Autograde chip and package (AEC Q100)
- Interfaces: SPI @8Mbps, 2 general purpose outputs
- Timer management
- Low power consumption.

# And tomorrow?

- Securing communication between critical ECUs within the car – e.g. the ECUs controlling the brake system and the brake pedal
- Securing V2X communication – e.g. vehicle to vehicle, vehicle to infrastructure, vehicle to pedestrian, based on WiFi 802.11p and 5G communications technologies
- Securing in-car payments – e.g. to pay for parking, tolls, petrol, multimedia content... directly from the car
- Authenticating drivers with biometrics – e.g. user-friendly and seamless keyless entry for car sharing/car rental use-cases.

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