AUTOMOTIVE OVER-THE-AIR SOFTWARE UPDATES

Over-the-air (OTA) refers to the process of wireless data transfer to a device. This method plays an important role in the execution of firmware updates (Firmware Over-the-Air, FOTA). In the mobile communications sector software updates for smartphones via WLAN or mobile network are ubiquitous. Now the automotive industry is discovering the benefits of uncomplicated updates, too.

Today’s automobiles have an increasing number of electronic control units (ECU), which are interconnected via vehicle networks (e.g. CAN, MOST). There is a strong demand from both OEMs and consumers for frequent/urgent updates of the ECU software via cellular networks. Urgent software fixes, feature upgrades and security patches can be deployed conveniently within a short time. Recalls that may damage the OEM’s reputation can be avoided in most cases.

The Novero Solution

Novero provides trusted TCUs (telematics control units) for OEMs in high volume for the US, Chinese and European markets since 2012. A Novero Gateway is the natural choice for FOTA, as it features a cellular modem and has access to the vehicle network. It can update its own software, as well as the software of other ECUs in the vehicle. Most importantly, it is a trusted device, integrated into the OEM’s security topology. In contrast to a head unit, a Novero Gateway can be closed, i.e. interfaces like USB, UART, JTAG may be disabled both software- and hardware-wise.

The Novero Gateway solution includes:

› Authentication, encryption, validation and firewall
› Built-in hardware security module (HSM)
› Secure storage, random number generation
› Additional storage space for buffering the ECU firmware
› Quick Cellular- and Wi-Fi access for large data packets
› Access to control devices via several buses (e.g. CAN)
› Robust, fail-safe design
FOTA - A joint effort for data security and efficiency

With an increasing number of cars and ECUs to be updated over-the-air, data transfer efficiency will play an important role regarding costs and update times. There are also strong concerns that FOTA may affect the vehicle’s security by providing remote access to the in-car electronics system. A worst case scenario is that intrusion has an impact on the vehicle’s safety. In order to manage those challenges and the complexity of an OTA system, joint efforts of different disciplines are needed.

**Red Bend** provides techniques for incremental updates that help to reduce costs and update times. vRapid Mobile technology provides extremely compact update files and allows for on-the-fly updates, even of small, resource limited ECUs. The technology achieves significant update time and bandwidth reduction of cellular and CAN data transfer. The Red Bend solution includes:

- vRapid Mobile Update Generator
- vRapid Mobile Update Installer

**ESCRYPT** provides the necessary security components. The solutions address end-to-end and embedded device security, managing all the certificates and keys for ECUs and secure OTA communication, generating signatures before or during upload to software management backend servers and validating authorizations, while complying with the safety rules and policies set by the vehicle OEM and agreed to by the vehicle driver.

- Secure Key Management Solution (KMS)
- Generation of Signatures
- Validation of update authorization, authenticity and integrity
- Secure channel between the vehicle and the backend server

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**About Novero**

Novero develops and manufactures flexible automotive solutions for telematics, car communication, multimedia connectivity and mobile device integration. The company is a pioneer and driver in the field of connected car engineering and combines hardware expertise with an outstanding knowledge about the application of leading edge technologies.

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**About Red Bend Software**

Red Bend Software is the leader in Mobile Software Management with over 2 billion devices that use Red Bend products and services for firmware over-the-air updating, application management and virtualization. More than 100 leading manufacturers and automotive companies trust Red Bend to make their vehicles and services continuously better in a rapidly changing world.

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**About ESCRYPT**

ESCRYPT - Embedded Security is the leading system provider for embedded security worldwide. For automotive manufacturers and suppliers, ESCRYPT offers products and services at all levels, including security system designs, security implementation in software and hardware, and necessary IT infrastructures such as large-scale, device-centric key management solutions.

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