

X Infotech Digital Tachograph

What is a digital or smart tachograph?

A digital tachograph is a device fitted to a vehicle that digitally records its speed and distance, together with the driver's activity selected from a choice of modes. It's a digital version of the analogue tachograph system.

The digital system records information on a range of vehicle and driver activities. Data is stored in the vehicle unit memory and on driver cards.

A digital tachograph system consists of a digital driver card, the tachograph head, and a sender unit mounted to the vehicle gearbox. The sender unit produces electronic pulses as the gearbox output shaft turns. These pulses are interpreted as speed data by the head. The sender unit and head are electronically paired and the pulses from the sender to the head are encrypted, therefore deterring tampering by intercepting or replicating the pulse signal in the intermediate wiring.

As well as automatically receiving speed data, the tachograph records the driver's activity selected from a choice of modes. The 'drive mode' is activated automatically when the vehicle is in motion, and digital tachograph heads usually default to the 'other work' mode upon coming to rest. The 'rest' and 'availability' modes can be manually selected by the driver whilst stationary.

In Europe, drivers are legally required to accurately record their activities, retain the records and produce them on demand to transport authorities who are charged with enforcing regulations governing drivers' working hours.

New regulation, Generation-2 Smart Tachograph specifications

Council Regulation (EU) N° 165/2014 on recording equipment in road transport provides the basis for the tachograph. This aimed at helping to enforce the rules on driving times and rest periods and monitor the driving times of professional drivers in order to prevent fatigue, and guarantee fair competition and road safety.

It is obligatory to install a digital tachograph in new vehicles having a mass of more than 3,5 tonnes (in goods transport) and carrying more than 9 persons including the driver (in passenger transport).

Regulation (EEC) N°3821/85 has been updated by Regulation (EU) N°165/2014 (also called "Generation-2 Smart Tachograph specifications") which introduces the smart tachograph, which will be installed in vehicles registered for the first time as from 15 June 2019, will be fitted with the following new and advanced features:

- better security mechanisms to make fraud more difficult and reduce the administrative burden, which is expected to save companies €515 million per year;
- an interface with the satellite navigation systems (GNSS), especially Galileo and EGNOS European GNSS Agency ;
- a remote communication facility to communicate the tachograph data to a police enforcer on the roadside when the vehicle is moving, thus avoiding unnecessary stops for checking;
- an ITS interface to link the tachograph with other ITS applications.

By ensuring better compliance with rules on driving times and rest periods, drivers will be better protected and fair competition will be assured.

On 18 March 2016, the Commission adopted the implementing Regulation EU 2016/799, defining the technical specifications for the smart tachograph.

Reasons to implement a digital tachograph solution

- To ensure compliance with the EU regulation
- Increase road safety – less accidents and improved road safety by reducing identity fraud, excess driving time and speeding
- Smart way to fight abuse or any other types of manipulations
- In-depth analysis of driver working conditions
- Better working environment for drivers
- Fair competition between transport companies

Advantages of digital tachographs

- The digital data stored by the tachograph system can be analysed by computer and infringements automatically identified.
- Digital data is encrypted and cannot be altered or deleted by the driver once stored on the card or in the head.
- Information is more explicitly defined in digital form and is less likely to be misinterpreted. When an analogue chart is visually analysed, a margin of error is present, dependent on the quality of the recording and the skill level of the analyst.

Types of tachograph cards

There are several types of digital card, depending on the function of the card owner:

- **Driver cards** are issued to drivers and used by drivers to record driving information. The driver has only one valid card. A valid driving license & face photo are required for the application process.
- **Company cards** are used by operators to retrieve data regarding their employees from the tachograph. It also allows a company to lock information so that it cannot be subsequently obtained by another operator. The application must include an official document confirming that the company uses vehicles with mounted digital tachographs.
- **Control cards** are used by law enforcement agencies to retrieve data from the tachograph. A control card overrides any company locks put in place by operators. Cards may be personalized for an individual (e.g., control officer) or control unit. The application requires a face photo if the card is personalized for the officer.
- **Workshop cards** are used by authorised tachograph technicians to fit and calibrate tachographs. Workshop smart cards operate with a PIN. The application must include a face photo and official certificate that approves workshops and states the competency of technicians.



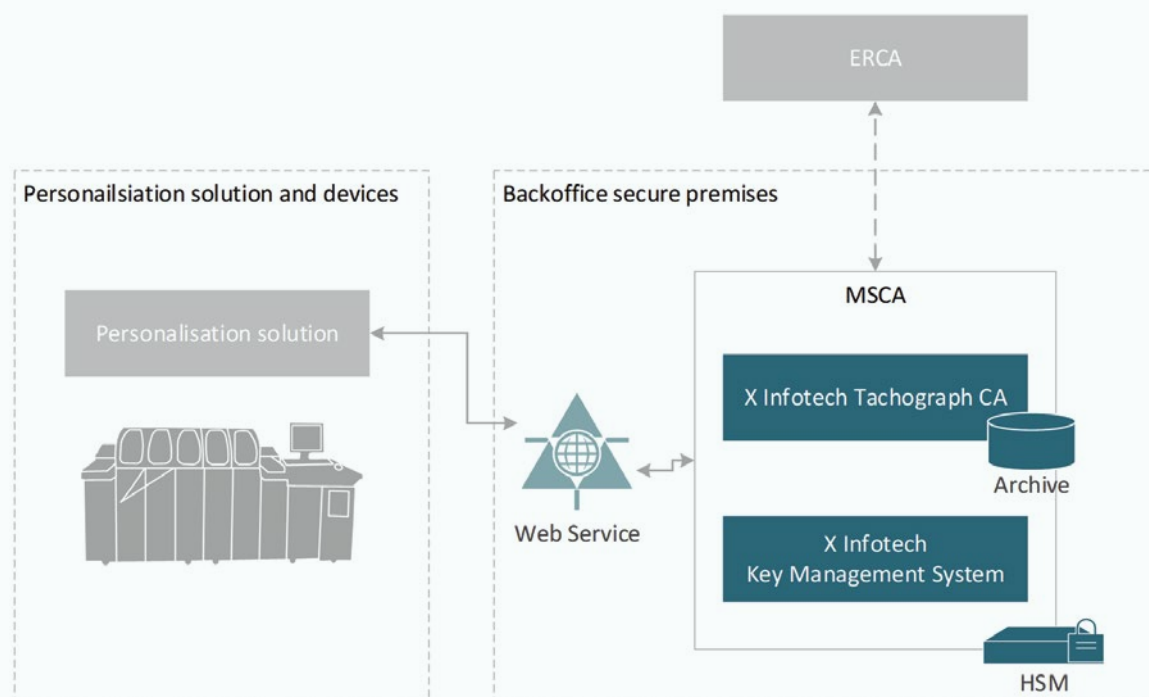
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Solution overview

X Infotech offers a turnkey solution fully compliant with the requirements of the Generation-2 Smart Tachograph specifications. The complete solution includes delivery of technological equipment, software and related services, such as integration of all components into single system along with the technical support after implementation.

Offered solution is fully independent and compatible with various equipment currently available in the market. Moreover, the solution is modular, which allows to upgrade the system with minimal impact to the existing environment at any stage in the future.

Following schema provides preliminary overview of the proposed system architecture



X Infotech Tachograph CA

X Infotech Tachograph CA is a PKI (Public Key Infrastructure) software solution component that issues Tachograph card certificates by digital signing of card public key and corresponding card data. X Infotech Tachograph CA generates private keys in accordance with Annex IC Appendix 11 and ensures integrity and authenticity of the issued document. MSCA's certificate is issued by ERCA (European Root Certification Authority).

X Infotech Tachograph CA stores all issued certificates in database and provides audit GUI for issued certificate browsing. All cryptographic operations are performed by Hardware Security Module (HSM), meaning that sensitive data never appears in unencrypted format. All significant security events in X Infotech Tachograph CA software will be automatically logged and timestamped.

Certificate generation simplified workflow

1. X Infotech Web Service receives certificate request with Tachograph card certificate metadata and public key;
2. X Infotech Tachograph CA generates Tachograph card certificate and signs it and returns it via Web Service Interface;
3. X Infotech Tachograph CA stores certificate in archive for later auditing purposes.

Digital Tachograph Cards

Case Study



Project: Software solution for personalization of digital tachograph cards with an integrated chip
(Программное обеспечение для персонализационного комплекса карт цифрового тахографа)

Country: Belarus

End-customer: Government Authorities, Private Sector

Subcontractor: CryptoTech <http://cryptotech.by/about/info/>

Launch: Autumn 2017

Country specifics:

Population in Belarus: 9,5 million

Card personalization facilities: approx. 300 cards per day

Road accident index: average

Regulation

The United Nations Economic Commission for Europe (UNECE) has incorporated the European Agreement Concerning the Work of Crews of Vehicles Engaged in International Road Transport (AETR) that aims to prevent drivers and crews of commercial vehicles of more than 3.5 tons, or transporting more than 9 people, engaged in international road transport, from driving excessive hours. In particular, Appendix 1B of the Annex to the AETR specifies requirements for construction, testing, installation and inspection of the digital control device used in international road transport.



Reasons to implement a digital tachograph solution:

- to comply with regulation increase in road safety – less accidents and improved road safety by reducing identity fraud, excess driving time and speeding
- Smart way to fight abuse or any other types of manipulations
- In-depth analysis of driver working conditions
- Better working environment for drivers
- Fair competition between transport companies

Types of Tachograph Cards



Driver card

Driver cards are issued to drivers and used by drivers to record driving information.

- Smart cards are issued to drivers.
- The driver can have only one valid card.
- A valid driving license & face photo are required for the application process.



Workshop card

Workshop cards are used by authorised tachograph technicians to fit and calibrate tachographs.

- Smart cards are issued to workshop technicians who install, activate and calibrate digital tachographs in vehicles.
- Smart cards operate with a PIN.
- The application must include a face photo and official certificate that approves workshops and states the competency of technicians.



Company card

Company cards are used by operators to retrieve data regarding their employees from the tachograph.

- Smart cards are issued to companies operating road transport.
- The application must include an official document confirming that the company uses vehicles with mounted digital tachographs.



Control card

Control cards are used by law enforcement agencies to retrieve data from the tachograph.

- Smart cards are issued to road transport control officers and customs officers.
- Cards may be personalized for an individual (e.g., control officer) or control unit.
- The application requires a face photo if the card is personalized for the officer.

Project overview:

X Infotech deployed a solution for personalization of digital tachograph cards. Solution includes the Member State Certification Authority and card personalisation software. Personalised cards are compliant to the European Agreement Concerning the Work of Crews of Vehicles Engaged in International Road Transport (AETR) regulations. Implemented solution includes following components:

- X Infotech MSCA
- X Infotech Chip Encoding
- X Infotech Data Preparation
- X Infotech Key Management System
- Print client for laser engraving personalisation machines
- Tachograph cards personalisation scripts

X Infotech solutions integrated:

- X Infotech Tachograph Public Key Infrastructure (PKI).
- X Infotech Data Preparation, Chip Encoding, Key Management System, Document Production and Secure PIN Manager for personalization of tachograph cards.
- The implemented software solutions are hardware and chip independent.