

Toll Collection System in the Federation of B&H

Toll Collection Systems

Investor: the PE Motorways of the Federation of Bosnia and Herzegovina, Ltd, Mostar

Project: „Supply, installation and maintenance of equipment and program support for the closed Toll Collection System in the Federation of Bosnia and Herzegovina”

Project value: 3,193,395 EUR

Year of completion: 2012

PROJECT DESCRIPTION

The Toll Collection System, delivered by the Institute Mihajlo Pupin for the purposes of the PE Motorways of the Federation of Bosnia and Herzegovina, is a closed toll collection system. The system is installed on the motorway stretch Jošanica – Kakanj which is a section of the A1 motorway Svilaj-Bijača on the corridor Vc in the Federation of Bosnia and Herzegovina.

The installed toll collection system provides two operating modes: manual, which uses a magnetic ticket as a medium and electronic which uses TAG's. Data from magnetic tickets, together with the vehicle category are used for the toll calculation. It can be paid in cash or, for the first time in the Federation of Bosnia and Herzegovina, by credit cards.

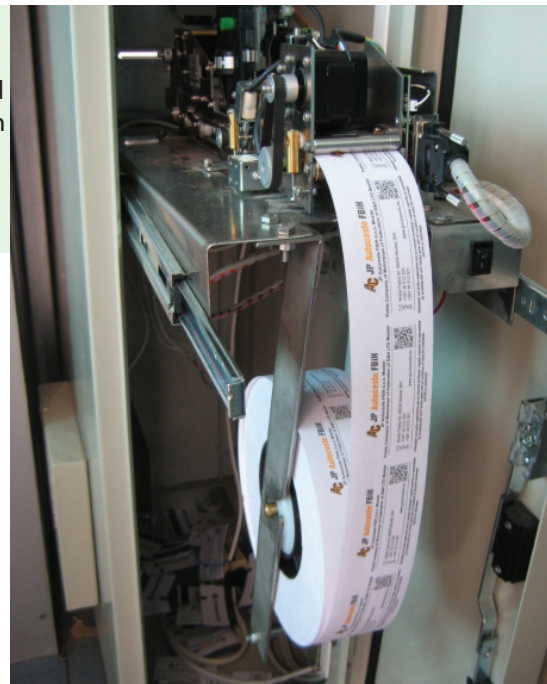
The electronic toll collection enables drivers to pay fee without stopping the vehicle as the toll is automatically calculated and deducted from the prepaid amount on the TAG.

Toll collection system includes 37 km long motorway section with six toll stations, two of which are frontal.

Works lasted for four months, and the toll collection system was put into operation officially on June, 2012.

CHARACTERISTICS OF THE TOLL COLLECTION SYSTEM

The toll collection system in the Federation of Bosnia and Herzegovina is realized as a closed system consisting of three physical and operational levels: traffic lane level, plaza level and central level. It is technologically up-to-date system which enables interoperability, high reliability, and easy maintenance. It also meets required standards for the toll booth operators work environment as well as ecological and environmental protection standards. This system is fully in accordance with the recommendations of CEN TC278 and CEN TC224 and especially with CEN TC278/WG and CEN TC278/WG2, providing international interoperability. Electronic toll collection system is also a part of intelligent transportation systems and it meets the requirements defined by the provisions of the ISO TC204/WG1 and ISO TC204/WG7.



Lane level

At the lane level the functions of entrance and exit from the motorway are performed. There are three types of exit and entrance toll collection lanes:

- manual,
- mixed (manual + ETC) and
- electronic (ETC) lane

Data carrier for manual toll collection is a paper magnetic card with two magnetic stripes on which data is entered according to the ISO 2 standard and with graphic record of vehicle time and place of entrance to the motorway, vehicle registration number recognized by the license plate recognition system (LPRS) and the level of card issuing.

In mixed and ETC lanes Data carrier can be either magnetic card or TAG (ETC device) recording all relevant data for travelling in a closed system. The user cannot enter the motorway without regular entry data. Any other entrance is considered to be irregular and the user is charged by penalty tariff at the exit.

Plaza Level

At the plaza level the functions of surveillance and control, as well as data acquisition and processing are performed. Most of these functions are executed at the plaza server providing accurate and timely data on the entire plaza operation including data on cashiers' work, equipment functioning, traffic and defining the plaza configuration. Creation and printing of the large number of reports at the request of the authorised persons is enabled by the functionality of data acquisition and processing.

The Plaza Server exchanges all relevant data with the Central Level.

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Central level

The Central level is a place where all system parameters are stored and updated, and also a place where all toll collection process data are collected from hierarchically lower levels (plaza/lane). Various business and operating reports are obtained by collecting, archiving and processing these data. These reports are used as a basis for bringing tactical and strategic decisions regarding toll collection system. Communication and integration with internal subsystems and external users and partner systems are realized through the Central level.

At the Central level all data are stored in the Oracle database, while the internal applications and services are implemented as Web-based applications on Oracle Middleware platform which consists of Oracle WebLogic application server and Oracle BI platform for data warehousing and analytical reporting (Data Warehousing – DWH). Functional architecture of the Central level is Multi-Tier, Event-Driven and Service-Composed.

Toll collection system software in B&H

Toll Collection system software is hierarchically structured, consisting of the software realized at lane level, plaza level and central level.

At the lane level the real-time processes, which are directly related to the installed equipment, are controlled by the processing computer. Due to the required response speed and real-time functional response requirements, the computer application is realized on the real-time QNX6 OS platform.

At the plaza level the server collects and processes all data from the lane computers and stores them in the database. It manages and controls all interactions with the lane computers. The server operating system (OS) is LINUX, and database management system is MySQL.

The Central level is based on the Oracle Fusion Middleware 11g platform.

ADVANTAGES OF THE APPLIED SOLUTION

The direct toll collection, implemented in the Federation of Bosnia and Herzegovina, as well as in most of the European countries, is dominant because it is objective, i.e. the user pays for using the motorway only in the case when he is really using it. Also, this type of the toll collection brings the biggest income to the service provider, i.e. to the PE Motorways of the Federation of Bosnia and Herzegovina.

The installed system, realized by the Mihajlo Pupin Institute, belongs to the category of the most up-to-date classic toll collection systems. It enables both manual and “no-stop” electronic toll collection, either by cash in local or foreign currency or by credit cards. The optical cable along the motorway enables quick access to all data at the Central level or at any toll plaza.

Special attention in the system realization is paid to the tolling process control. Thus, the system enables creation of large number of reports on which basis any abuse can be easily registered by analysing and comparing data.

The system uses the last generation of ETC which enables interoperability, i.e. the same TAG device can be used for the toll collection even in other European countries, providing that the international agreement with the toll operators in these countries is reached. In the first month of operation 3000 TAG-s have been sold. Thanks to the excellent marketing campaign and offered discounts, the number of ETC users is increasing day by day. This significantly speeds up the payment process and increases the capacity of the toll collection system.

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