



PRODUCT

SESAMO-TOLL

Toll collection systems



Sesamo-Toll is the software platform for the management of transit and toll collection procedures at the entry and exit lanes of toll road infrastructures, tunnels and car parks.

SESAMO-TOLL

WELL-PROVEN TOLL COLLECTION SOLUTIONS

Thanks to the expertise acquired in over 30 years of designing software toll collection solutions for leading highway operators, Sesamo-Toll is a reliable solution capable of managing all subsystems composing a toll gate: lane hardware (barriers, traffic lights, etc.), vehicle detection and classification devices and user interaction devices (automatic ticket dispensers, intercom columns, displays). It can implement operation models for open toll systems as well as for closed ones.

A wide range of software modules fully developed by Aitek allows efficient and secure management of the entire toll collection procedure. Its great modularity allows to design fully customisable solutions according to the operational needs of toll road infrastructure managers.

The Sesamo-Toll software modules are capable of handling the entire transit procedure by managing all types of highway lanes: manual, automatic, dynamic (e-toll collection) or mixed.

Management of the entire transit procedure at entry and exit highway gates

Size-based vehicle classification

Issuing of entry tickets by means of automatic dispensers on interactive kiosks

Reading of entry tickets by means of readers placed on interactive kiosks

Access control by opening and closing deterrent devices

Full compatibility with toll collection systems of the highways authority

Remote connection with interconnected highways companies

Management of all payment methods used by motorway

Storage of transit data on a centralized Database



Modular toll collection systems

The software modules of Sesamo-Toll manage the entire toll collection procedure efficiently and safely. Its great modularity allows the development of solutions adaptable to different operational scenarios.

In order to control a process where a particular service is supplied to users, Sesamo-Toll includes modules able to detect and identify users, verify if the user is authorised to enjoy the service and manage the service fruition controlling the on-field devices and the acquired data.

All solutions are implemented on Aitek Linux embedded operating system, to ensure the system integrity and the highest level of cyber security.

Architecture

The architecture of the toll collection system is divided into two levels based on common key elements such as the "open" technology, compatibility with international standards, interoperability, scalability and availability.

The plaza level includes the toll lanes, CCTV cameras, vehicle number plate cameras, on-field devices for user assistance and the station server.

The central level includes all centralised system services and interfaces that enable communication with other systems, such as interface and reporting servers for communication with external systems, monitoring and reporting servers, back-end servers and databases.

User interface

The toll collection operators can control the toll lanes by managing the service status of all on-field devices. A special section shows the operations required to perform transit and collection procedures. Confirmation messages and warnings are also displayed.



Enforcement

Sesamo-Toll integrates enforcement functionality (cameras, number plate recognition systems, NVR video recorders): every time a vehicle transits a toll lane, the sequences acquired by the installed cameras are stored and associated with the unique transit ID.

TOLL PLAZA INFRASTRUCTURE



LANE EQUIPMENT

- ▶ DSRC Antennas
- ▶ Barriers / Traffic Lights
- ▶ CCTV Cameras
- ▶ Network Video Recorders
- ▶ License Plate Recognition system
- ▶ POS reader
- ▶ Barcode / QR code reader
- ▶ Fiscal printer
- ▶ RFID reader
- ▶ Variable Message Sign
- ▶ Display
- ▶ Intercom

ENTRY LANES

- ▶ **AUTOMATIC**
Issuing of tickets
- ▶ **DYNAMIC**
Reading of the DSRC On-Board Unit
- ▶ **MULTIMODAL**
dynamic or automatic (if the vehicle is not equipped with a DSRC OBU unit)

EXIT LANES

- ▶ **MANUAL**
With collection operator
- ▶ **AUTOMATIC**
Automatic cash desk (cash and cards)
- ▶ **DYNAMIC**
Reading of the DSRC On-Board Unit
- ▶ **MULTIMODAL**
dynamic or automatic (if the vehicle is not equipped with a DSRC OBU unit)

TOLL COLLECTION PROCEDURE

Step 1 Classification

The lane system detects and determines the class of the vehicles by mean of the Automatic Vehicle Classification (AVC) subsystem. This process implies a new transaction is started; the lane system assigns a unique identification number to the new transaction (TIN). Each event occurring during Sesamo Tolling system the lane crossing is collected, labeled with the TIN and individually delivered to the plaza backend.

Step 2 Identification

If the lane is opened in dynamic mode, each time a vehicle approaches the lane the DSRC antenna is switched on in order to try to communicate via RF with the vehicle OBU. During the identification phase the lanes provides to compute the toll amount according to the detected vehicle class.

In case an OBU communicates with the antenna, the lane starts a RF transaction in order to get all the data needed to identify the OBU provider, the customer, etc. By mean of white and black list the lane checks the OBU validity and the possibility to use it for charging the toll amount.

Step 3 Toll Collection

Sesamo-Toll collects each transit event and delivers it to the backoffice application; each single event belonging to a specific transit is labeled with the same unique transit identifier and a timestamp. All diagnostic events are delivered to backoffice application, allowing the central operators to efficiently monitor the toll collection lanes. In case of anomalies during transit, a central operator can remotely manage the lane and each single phase of the transit, by manually inserting missing data or correcting them.

Step 4 Authorization

Once the toll collection process is successfully finished, the lane system allows the vehicle to exit the gate by opening the exit barrier.

Step 5 Conclusion

The AVC system verifies that the vehicle has left the lane to close the barrier. The transaction is closed.



SOFTWARE MODULES



Sesamo - LANE

Basic software for the implementation of toll lane management applications. It sets the operating status of the lanes, detects vehicles and enables their transit.



Sesamo - AVC

It manages field devices for the classification of vehicles in size classes (inductive loops, optical barriers) and deterrent devices (barriers, traffic lights).



Sesamo - LPR

Recognition of vehicle license plates using OCR technology. It provides the automatic recognition of front and rear plates - including trailers - of vehicles.



Sesamo - REC

Acquisition and storage of recordings of each transit.



Sesamo - SPEED

Real-time estimation of the speed of vehicles in transit.



Sesamo - UHF

Management of identification devices based on RFID UHF technology.



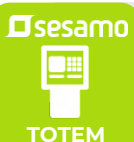
Sesamo - BCR

Management of barcode readers, QR code readers and badge readers.



Sesamo - POS

Management of bank credit card readers for toll payments.



Sesamo - TOTEM

Module for managing user interaction through self-service terminals.



Sesamo - DB

Module serving as an interface with a server for the real-time transfer and storage of transit data.

sesame toll

- ▶ 270 managed plaza
- ▶ 2400+ managed lanes
- ▶ Solutions in 6 countries
- ▶ 35+ years of expertise





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