



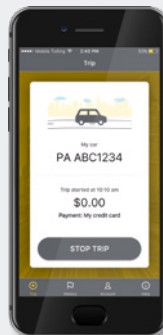
kapsch >>>
challenging limits

Kapsch TrafficCom

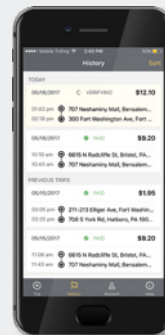
Mobile tolling services. *Smartphones facilitate toll collection.*

Smartphones keep forging ahead: already numbering more than 3 billion devices worldwide, the number of smartphones is expected to reach 6.1 billion by 2020. Work, communication, information – intelligent mobile devices have already become closely integrated into most areas of our daily lives. And now, we are also using smartphones to facilitate toll collection.

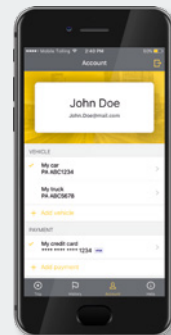
Smartphones are used in electronic toll collection (ETC) systems as a new payment method designed to complement tag, video, and cash-based tolling. For road users, the use of smartphones offers a convenient, cost-efficient and time-saving way to manage their accounts, receive real-time feedback on their journey, receive discounts on toll rates, and benefit from other value-added services. As the penetration rate of smartphones is particularly high among unbanked users, they benefit from this mobile tolling service which allows them to add funds to their account through prepaid options such as gift cards, personalized barcodes and similar.



The smartphone app automatically calculates and charges toll payments after a tollable trip has been started with the vehicle and payment method of choice.



The smartphone app allows users to access trip and transaction history. Selecting a single trip provides more details for the particular trip.



Customers can add, edit, and delete personal data, vehicle data, and payment methods for registered accounts.

Kapsch, as a mobile toll service provider, guarantees toll payments to agencies for all transactions by its valid customers. The agencies can therefore use this cutting-edge tolling technology risk-free,

while drivers on the toll roads benefit from an easy, interoperable tolling option. Deploying a mobile tolling service has the additional incentive that more road users drive on all-electronic (AET)

cashless lanes instead of conventional, toll-plaza lanes, which improves the environment and traffic safety.

Enhancing the video tolling process.

As depicted in the figure below, opportunities exist to reduce agency operating costs and enhance the overall perfor-

mance of video-based tolling by introducing mobile tolling services. Kapsch provides mobile tolling and image

validation solutions that fulfill these needs by allowing toll agencies to outsource the following processes:

> Account management and payment processing

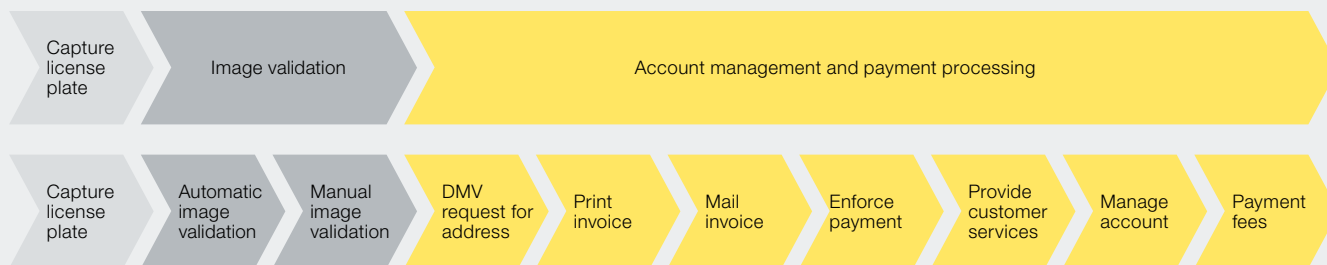
Any driver who wants to use their smartphone for tolling purposes may register with a mobile tolling service provider, such as Kapsch, who will assume account management and payment processing. This relieves the toll agency from managing the accounts and processing

the payments of mobile tolling customers (such as finding the correct billing address, printing and mailing the invoice, and enforcing any violations; see also the yellow-colored processes in the figure below).

> Image validation

In addition to standard automatic and manual image validation processes, video and mobile transactions can be further correlated based on license plate number, timestamp, and location. This correlation works even

when license plate images are only manually readable or entirely unreadable, thereby increasing the agency's number of fully valid toll transactions.



How does it work?

The implementation of mobile tolling requires minimum intrusion to existing systems. No additional hardware at the roadside, back office system, or vehicle interior is required. The future-proof system architecture supports any mobile

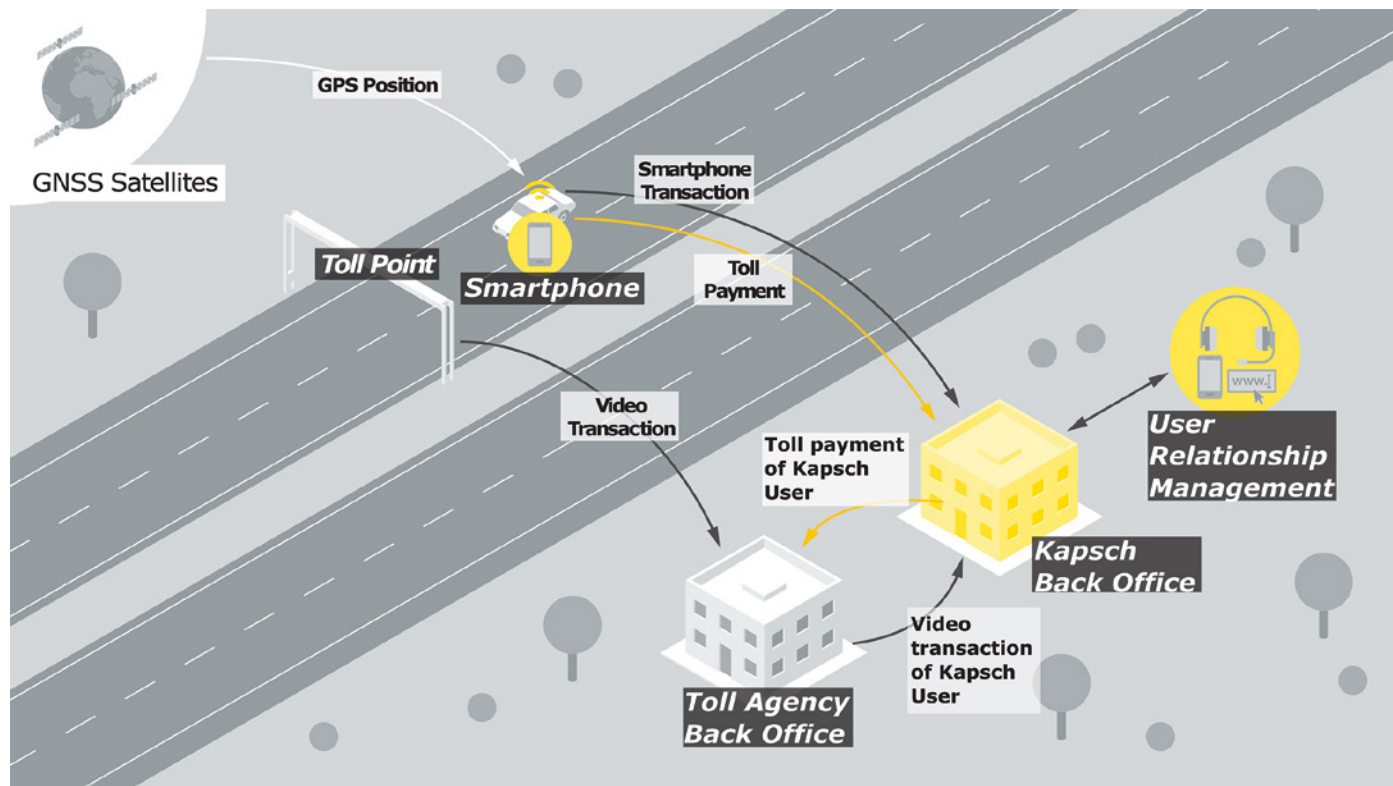
device capable of collecting and processing GNSS-based positions, which can include dedicated GNSS on-board units or commercial smartphones. In addition, the mobile tolling implementation has minimal impact on ongoing operations.

The service can be integrated into new and existing tolling systems and is designed for interoperability, which means it can operate on toll roads within different toll agencies.

When a vehicle passes toll collection point, two processes are initiated: video cameras at the tolling station record an image of the license plate and send it to the toll agency's back office system. Meanwhile, the smartphone app – using GNSS positioning (Global Navigation Satellite System) – detects that the driver

has entered a geo zone and transmits the passage to the Kapsch back office system. Kapsch uses the mobile device's location to calculate the toll rate, without interacting with the toll agency's roadside or back office systems. By receiving the video transactions of Kapsch users from the toll agency, Kapsch can also

verify and reconcile both toll transactions (thereby minimizing the agency's processing in their back office system, customer support, and toll leakage). This also allows Kapsch to guarantee toll payments to the agency for all of Kapsch's valid customers, which reduces the toll agency's risk of toll leakage even further.



Innovation that pays off.

The mobile tolling service ...

- > guarantees toll payments to toll agencies.
- > has minimal impact on ongoing operations.
- > increases convenience for road users.
- > is a valuable communication channel for communicating with drivers and can be used for further ITS applications.



Kapsch TrafficCom

Kapsch TrafficCom is a provider of intelligent transportation systems (ITS) in the segments of toll collection, city access control and parking space management, traffic management, traffic monitoring, utility vehicle monitoring, electronic vehicle registration and V2X cooperative systems. The end-to-end solutions of Kapsch TrafficCom cover the entire value creation chain of its customers, from components and design to the installation and operation of systems, all from a single source. The core business comprises the development, installation and operation of electronic toll collection and traffic management systems. Reference projects in more than 50 countries on all continents have made Kapsch TrafficCom a globally recognized ITS provider. As part of the Kapsch Group, an Austrian family-owned technology group founded in 1892, Kapsch TrafficCom is headquartered in Vienna, Austria, and has subsidiaries and branches in 33 countries. It has also been listed since 2007 on the Vienna Stock Exchange (KTCG) and earned revenues of EUR 526 million in the 2015/16 fiscal year. The company employs over 4,600 employees worldwide.

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