

ID-based ticketing as one of the answers for today's ticketing requests

In order to increase the market share of public transport, public transport companies want to improve their ticketing systems and provide their passengers with more convenient services. Therefore it is necessary to flexibly create new products and offer best price calculation schemes. In traditional card-based ticketing systems, much of the fare logic and data is hard coded on the cards in a data structure called the *card application*. This makes sales inflexible since new products cannot be added easily and the cards are expensive due to the amount of memory required.

However, in ID-based ticketing systems all of the data and logic is stored in the backend system and the cards are used merely as read-only identifiers. After their initialisation with a certain ID value, no changes have to be made on the card during the rest of its life cycle. Plus, third party cards can be integrated much easier. This means that to validate tickets, or use the stored value for a ticket purchase, the validators need to make an online request to the backend system.

Public transport requirements

ID-based online payments have been used for credit and debit card payments for decades. This is why contactless cards following the EMV standard (open loop) can be easily integrated into ID-based ticketing systems. However, there are some crucial differences between a normal retail – and the transport – environments, namely:

- Online connection to the backend system might not always be sufficient in the vehicles
- Due to restricted boarding times, the payment/validation has to be authorised normally in less than 500ms
- Logic for public transport payments is far more complex (capping, best price calculation etc.)
- Customers are often used to seeing their account balance in real-time.

Basically all these differences boil down to the requirement for sophisticated vehicle equipment like the passenger terminal PROXmobil2 or the ticketing machine/on-board computer EVENDpc, and to reliable and fast data communication between field devices and the backend system. Fast 3G and 4G mobile networks make ID-based systems possible, but sufficient mobile network coverage can't be guaranteed at all times, especially for the vehicle devices. Therefore, a certain set of business rules has to be defined and stored as fall-back logic with some offline data in the validators. This qualifies the validators to make a local risk assessment which shall generally be in favour of the passenger. Tariffs, products and business rules are set in the tariff



management (like MOBILEvario) and then released to the field devices via an Online Validation Server (OVS). This OVS serves real-time requests from the field devices and provides validation results as well as list updates (white/black lists).

INIT experience

INIT is currently realising ID-based ticketing systems in Turku (Finland) and Portland (Oregon, USA). In addition to these large-scale projects, INIT has already developed smaller-scale ID-based ticketing systems in Bavaria (Germany), Austin (Texas, USA) and Bremen (Germany). Experience has shown that the key to a sound ID-based ticketing system is a perfect combination of distributed intelligence provided by the validators and centralised intelligence in the back-office system. Fast 3G and 4G mobile networks today make ID-based systems possible, but online connectivity can't be guaranteed at all times. Therefore, intelligent business rules and fall-back logic is needed to provide system reliability and a good customer experience.

Benefits of ID-based systems at a glance

- Flexible implementation of new fare products and business rules
- Independency on the card application and card technology
- Cheaper cards with less memory
- Flexible integration of 3rd party cards
- Data in the card is always consistent since read only (i.e. anti-tear logic not necessary).

