NFC Transit White Paper

The Future is Urban and Mobile

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Secure ticketing for public transit using mobile devices

What you are about to read is a true story from Adelaide, Australia. One day, two girls aged 10 and 12 decided to explore the city’s stormwater drainage system – and promptly became lost inside the underground maze. Luckily, they’d taken a smartphone along. However, rather than calling the emergency services, they posted a message on Facebook. One of their friends noticed the message and contacted the police, who also used the social media platform to communicate with the girls instead of calling them direct.

Many people who heard this story asked themselves the same question: Why didn’t the girls simply call the police? Why the “detour” via Facebook?

This story provides two interesting insights: For these two girls – unlike their parents’ generation – the primary purpose of a cell phone is not to make phone calls; it’s a way of staying in touch with friends via the Internet. The ability to communicate through social media from any location is one of the key attractions for the young generation, along with mobile apps, site downloads, and online shopping.

Smartphones are taking over in every area of life

The advertising industry has recognized this trend and is increasingly leveraging the mobile channel for its campaigns, e.g. creating smartphone-viewable content that is accessed via 2D barcodes. Other sectors of the economy are also becoming increasingly aware of the enormous potential of smartphones to make everyday life a little easier for people around the world. In some places, the mobile phone is replacing conventional paper tickets as a means of paying parking fees. It is also well established as a convenient means of checking in at airports. It is easy to see how this technology could also be applied in public transit ticketing systems. Giesecke & Devrient has been developing solutions for this field that combine data security with efficiency, user comfort, and cost benefits.

The world’s population is growing exponentially – a dilemma for public transit

There are good reasons why Giesecke & Devrient is working on innovative mobile ticketing solutions for public transit. The evidence suggests that public transit systems, such as subways and other rail networks, will become even more important in the decades ahead. Forecasts predict the world’s population will reach 7.8 billion by 2030 and 8.9 billion by 2050. No less than 60–70 percent of world population will live in urban areas – that is more than the total world population today. To avoid disastrous overload, public transit infrastructure requires massive expansion ahead of this future demand. This presents not only
logistical challenges, but also financial difficulty. Faced with dwindling budgets, public authorities are likely to reduce transit subsidies in coming years rather than increase them. It will also be difficult for transit operators, at least in their current form, to shoulder these costs alone, especially when any major rise in fares is unlikely to be welcomed by passengers. It is therefore important to develop business models that boost revenues while at the same time reducing costs.

One such model is the contactless ticketing solution for smartphone users, pioneered by Giesecke & Devrient. Mobile ticketing of this kind offers several benefits for both commuters and transit operators. One concrete example of mobile contactless ticketing advantage is that it would significantly reduce the need for conventional ticket vending and validation machines, thereby reducing operating and maintenance costs for transit operators.

The smartphone as personal transit assistant

Smartphones and more extensively smart handheld devices are now so widespread that there would be no shortage of users for a mobile ticketing system. Worldwide penetration for mobile phones is now around 70 percent and continues to grow rapidly. Especially smartphones are becoming more and more popular. Yet, in order to take advantage of mobile ticketing systems, special NFC-enabled phones are needed. This kind of phones have an antenna integrated into them which is necessary for c‘less transactions.

NFC-enabled Smartphones are already being used as a convenient payment method in many sectors, and being tested in others. Applied to public transit, a smartphone can offer more than just mobile ticket vending. Thanks to its comfort and convenience, mobile ticketing will attract new passengers to the bus, rail, and subway networks. Many people avoid public transit because of inconvenient timetabling, overcrowding, confusing price structures, and the hassle of conventional ticket vending systems. A smartphone-based solution not only makes it easier to buy tickets, it also provides a platform for a wide range of additional app-based products, e.g. online timetables, intelligent pricing systems offering the most cost-efficient ticket options, route planners, and local event guides.

Benefits for passengers and transit operators

While passengers benefit from the greater comfort and flexibility of cashless ticket purchases and mobile information services en route, transit operators will be able to redeploy staff elsewhere thanks to no longer selling tickets on buses and trains. Due to continuous monitoring of passenger volumes, transit operators can optimize deployment of their resources. The capacity on each route can be exactly matched to actual demand, thus reducing costs.
How does the mobile ticketing concept from Giesecke & Devrient work?

In order to use the mobile ticketing system on a given transit network, the customer first has to download a mobile ticketing app at his NFC enabled Smartphone and connect that to a preferred payment method, e.g. credit card. When using a ticket, the customer simply holds the phone near the ticket validator device and off you go. If more value, either in time or money, needs to be reloaded into mobile ticketing app, consumer can use mobile phone to connect to payment system Over-the-Air and transfer value from the earlier linked payment instrument such as credit card. For the system to function properly, close cooperation between various partners is essential:

- Transit system operators
- Mobile network operators to facilitate the virtual ticketing system
- Banks/credit card providers to handle ticket payments
- Trusted Service Manager (TSM) to
  a) coordinate all processes between passengers and the system partners and
  b) ensure that all data communications are secure

How can Giesecke & Devrient help to implement a virtual ticketing system?

Giesecke & Devrient already has extensive experience in Near Field Communication (NFC) and secure (virtual) payment systems. The company has a deep understanding of all the relevant processes within public transit and can deliver the required technologies to the highest quality standards. These technologies range from embedded software solutions and SIM cards to contactless data communication systems and custom-developed or licensed secure application.

As a world-renowned specialist in security solutions, Giesecke & Devrient has the expertise required to meet the very highest expectations in the role of Trusted Service Manager. As TSM, we provide the necessary NFC applications for smartphones as well as robust protection for the wireless data channel against hacking via secure personalization and positive identification of authorized users.

In addition, Giesecke & Devrient provides full lifecycle management, enabling ongoing modification or adaptation of mobile ticketing and payment applications
as required. Possible functionality includes user-oriented options, such as temporary blocking of the transit application if another person is using the phone.

An extensive network of system partners comprising banks, credit card companies, mobile network operators and TSM providers can create mobile ticketing solutions within a short space of time that are both sophisticated and provide exceptional quality.

NFC solutions for public transit systems are familiar territory for Giesecke & Devrient. The company has already played a major role in a number of important projects in the United States, the United Kingdom, Germany, Korea and Turkey.

**And what can we expect the mobile world to look like in a few years?**

Those two young girls from Adelaide are now at a university there. Not literally, of course, given that most of the lectures are webcast to students at home. Each student has a laptop with webcam plus a tablet computer offering direct access to online libraries with specialist reference resources. As part of their studies, the girls have internships at a local hospital and use the subway system to get there. The trains are never crowded because the operator responds to rush-hour passenger volumes by increasing the frequency of service and length of each train. When looking for somewhere to go in the evening, one of the girls scans the barcode on a flyer for a trendy new club in town – using her smartphone, naturally. The code provides the address and details of events as well as a voucher for a free drink. The girls hadn’t planned to go back downtown, but when they return to the subway station there’s no extra fare to pay. Instead of charging each girl for four single tickets, the intelligent fare system automatically combines all their journeys that day into a cheaper one-day pass.
About G&D

Giesecke & Devrient (G&D) is a leading international technology provider headquartered in Munich, Germany. Founded in 1852, the Group now has a workforce of over 10,000 employees and generated sales of EUR 1.7 billion in fiscal 2010.

61 subsidiaries and joint ventures in 32 countries ensure customer proximity worldwide.

In all its markets, G&D is a global leader and pioneering innovator in the production and processing of banknotes and banknote paper, security documents, identification systems and smartcard-based solutions. As an end-to-end provider of mobile security applications, G&D develops and sells hardware, software, and services for banks, mobile network operators, public transportation companies, business enterprises, and OEM.