Touch&Travel – NFC based automatic fare collection using a passive infrastructure
NFC Forum: Transport and City Life focus group

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Agenda

1. Deutsche Bahn’s general eTicketing position
2. Touch&Travel: Automatic fare collection via mobile phones
The existing ticketing portfolio will be expanded during the next years

User authentication

"Buy before"
- Secure paper
- Standard paper
- Smartcard, mobile phone (electronic)

"Pay-as-you-go"
- Smartcard, mobile phone (electronic)

User medium

Example
- Ticket bought in a ticket office
- Ticket bought via WWW
- Ticket bought via mobile phone
- CheckIn/CheckOut with monthly billing

Focus
eTicketing has to fulfil fundamental requirements – low infrastructure costs speak in favor of mobile phones

Premises

- High user acceptance
- Easy use
- Cost-effectiveness
- Mass capability
- Broad applicability (long and short distance traffic and additional services)
- One standard in Germany / compatibility in Europe
- Safety

- Mobile phones could meet the requirements in principle
- High comfort by using multi-functional devices
- Technologies have to be developed and tested

- Mature technology
- Internationally successful approaches can not be transferred to Germany
- High costs for infrastructure make systems inefficient

*) Those approaches are usually implemented in urban areas and within gating structures – Germany in contrast to that is a very heterogeneous country with open passenger traffic systems
Deutsche Bahn’s mobile services are constantly being further developed

- **2001**
  - Timetable services for WAP
  - Online timetables for 50,000 European stations

- **2002**
  - Upgrade to address-level information (incl. points of interest)

- **2003**
  - Java-based personal timetable (downloadable)
  - Arrival/departure boards

- **2005**
  - Seat reservation by mobile phone

- **2006**
  - Mobile phone ticket containing a 2D-barcode booked via WAP and delivered as MMS

- **2008**
  - Start pilot Touch&Travel
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Touch&Travel - the modern way of travelling

- Simple and flexible access to public transport using mobile phones
- No ticket purchase, no tariff knowledge required
- Low infrastructure costs in comparison to smartcard systems, because data is transferred via mobile networks
Touch&Travel – Just step in…

1. Access medium
   - NFC enabled phone as access medium

2. Registration
   - Initial registration and application download

3. Touch In
   - Touch In before journey starts
...and travel

3 Ticket inspection

- Check In status can be inspected

4 Touch Out

- Touch Out at the end of the journey

5 Billing

- Monthly billing
The backend system calculates routes and prices based on the collected data.

Mode of operation

Boarding – Touch In
1. Placing the device in front of the Touchpoint and confirming
2. Ticketing data is transferred from Touchpoint to mobile phone
3. The mobile phone transfers data to the central ticket server
4. The central ticket server issues the travel authorization and transmits data via mobile network to the cell phone

Billing
7. Travel itineraries are sent from the ticket server to the billing server
8. The system reconstructs route and price and bills the customer
9. The bill is transferred to the customer via e-mail

Deboarding – Touch Out
5. Mobile phone transfers data to the ticket server
6. The journey is finalised and the travel authorization on the mobile phone is reset

9.
Partners from public transport as well as from industry are involved

A project by...

DB BAHN

vodafone

T-Mobile

...in co-operation with...

BVG

ViP Verkehrsbetrieb Potsdam GmbH

...and the technology partners...

MOTOROLA

NXP

ATRON

Giesecke & Devrient security at work.
At the moment 200 friendly users are testing the basic functionalities of the system

- 200 Friendly users are testing Touch&Travel for 6 months
- In addition, standard tickets are still required

First pilot phase
(started Feb 2008)

Second pilot phase
(to start Dec 2008)

- At least 2,000 users will be testing Touch&Travel as a real operating system
- Intensive market research will be conducted
Properties of the pilot region

- Complex structure guarantees transferability to Germany as a whole:
  - Long distance traffic Hannover-Berlin: alternative routes and parallelism of different types of trains (ICE, IC, RE)
  - City areas Potsdam/Berlin:
    Heterogeneous networks with many different means of transport (different regional trains RegionalExpress and RegionalBahn, S-Bahn, tube, tram, bus, express-bus, ferry)
Touch&Travel and the German eTicketing standard 'VDV Kernapplikation' (KA)

Touch&Travel is the only mobile phone based ticketing approach compliant with the 'VDV Kernapplikation' (KA)

- On the SIM a KA user medium is securely stored (smartcard applet developed by ATRON electronic, already utilised on smartcards in NRW, extended by special Touch&Travel functionalities)
- Personalisation and issuing of entitlements is done over-the-air (OTA)
- All transactions – personalisation, issuing, data collection, inspection – are executed according to the KA specification employing all mandatory asymmetric and symmetric cryptographic algorithms incl. certificates
- The new tag authentisation has been discussed with the KA Gmbh & Co. KG (custodian of the KA standard)
- Solely the security authentication modules (SAMs) are emulated during the trial phase using self generated keys
Outlook: Touch&Travel offers more than CheckIn/CheckOut

Touch&Travel phones may store tickets bought before as well

- Using the German eTicketing standard 'VDV Kernapplikation' offers the possibility to store tickets like 7-day or monthly tickets securely
- Ticket inspection works exactly like in the case of smartcards
- Many ways to order the tickets are conceivable: WWW, WAP, Call-Center…
- CheckIn/CheckOut is performed only when the area of validity of the time card is left
- Synergies with smartcard approaches can be exploited

Picture sources: VRR, KVV, Wiener Linien, VDV (WWW)
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3. Questions?