Experience report about the “BAIM” and “BAIMplus”-project of VBB

Alexander Pilz
Department Head - Customer Information
VBB Verkehrsverbund Berlin-Brandenburg GmbH
28.06.2011
Content

- BAIM
- BAIMplus
- Further activities
VBB in brief
Where is VBB located at?

federal states of Berlin and of Brandenburg

Area: 358,000 km²
Population: 82 million

GERMANY
VBB: brief overview

100% public owned
- Berlin + Brandenburg
- municipal districts: 18
- founded in 1996

data
- 30,000 km²
- 6 mio. inhabitants (3.5 mio in Berlin)
- 41 transport operators
- >1,000 train and bus lines

main tasks
- customer service and information
- marketing, tariff, and sales
- revenue sharing
- rail tendering, planning, contracting, and controlling
network basics

- **lines**: 1,040
- **stops (both directions)**: 13,125
- **stations**: 638

Source: VBB
September 2005 to April 2008

May 2008 to October 2010
Project team both projects

Partner: funded by:

(auch Koordinator)
Idea of project BAIM

Developing information services for people with reduced mobility in the field of public transport

- information about the accessibility and usability of public transport systems
- all journey stages, from planning to travelling
- analysis of the different requirements of user groups
- static and dynamic information
Target groups

help is needed for different target groups
  • deaf people
  • wheelchair user
  • elderly people
  • blind / visually impaired
  • parents with buggy
  • travellers with baggage
Project steps BAIM

step 1:
- Users needs and requirements
- data base

step 2:
- Web based services
- Static information

step 3:
- Gaining dynamic information
Users needs and requirements

- Evaluation existing travel planning system
- Market research for planned services
  - Mobile
  - Voice recognition system
  - Desktop-PC based
Routing principle
Collected data

- footpaths (barrier free, not barrier free)
- elevators (Measurements, controls/operating elements, transfer time)
- escalators (Measurements, transfer time)
- stairs (number of steps, height/length/depth, landings)
- coordinates of entrances, stops, ...
- navigation assistance (leading line for blinds etc.)
- local information (location maps, visual and acoustic information about the next departures etc.)
- opening times of entrances and elevators
- more barrier free-relevant facilities (barrier free toilet, ramp etc.)
- … and much more!
Amount of data sources

638 stations in Berlin and Brandenburg:

- Train, S+U-Bahn = 6
- S/U-Bahn = 20
- S-Bahn = 116
- U-Bahn = 146
- Train, S-Bahn = 20
- Train = 330

additional about 750 important connecting stops of public transport in Berlin and Brandenburg
Preparing data collection

- detailed preparation by existing databases, location maps and satellite images
  → identify all possible via-points (saves time...)
- in some cases permissions are required
- equipment
Example I: small station S Halensee
Example II: complex station Berlin Alexanderplatz

Public transport connections:
5 RegionalExpress-lines,
1 RegionalBahn-lines,
5 S-Bahn-lines
3 U-Bahn-lines,
4 Tram-lines
7 Bus-lines
Example II: complex station Berlin Alexanderplatz

S+U Alexanderplatz Bhf: footpaths on ground level (level 0)
Example II: complex station Berlin Alexanderplatz

S Bahn

Bus & MetroTram Sammel-Hst.

MetroTram

N5  N8  148

DB

0

- 1

- 2

- 3

- 4

- 5

- 6

Ausgang + U5

Ausgang + U8

U2

Ausgang + U8

U8

Ausgang + U2

Ausgang + U8

U5 (Hönow)

U5 (Endbahnhof)
Example III: Potsdamer Platz
Example III: Potsdamer Platz
Examples for data base: Vehicle equipment

Collection of information about vehicle equipment and timetable data

- transport operators information about barrier-free vehicles and timetable data
- VBB integrates information in timetable data base
- data are base for barrier-free routing
Interaction with the users for interface design

- communication with users during set up of Internet and speech based systems
- market research with interviews of 50 people
- user survey via www.vbbonline.de
- containing continuous users, occasional users plus people without experiences with travel planners
- much feedback about:
  - functionality
  - usability
  - wording,…
Settings for route planning I
Settings for route planning II

Detail settings
Results -1- : standard recommendation
Results -2- : route particular barrier-free
Results -3- : route fully barrier-free
Results -3- : details of interchanges

| Interchange | 12103 Berlin-Schöneberg, Grabenstraße 32 | 24.09.09 | 
|-------------|------------------------------------------|----------|---
| U Schönhauser Allee | | | 
| U Schönhauser Allee | | | 
| S+U Alexanderplatz, U8 | | | 
| Bushaltestelle 100/200/212/284/54/T/U, Endahl/Prenzlauer Allee | | | 
| Zugang (Ausbau) U8/US2 | | | 
| Zugang (Ausbau) US2 | | | 
| Bahnhof U8 Hönow/Ausbau zum Bahnhof US2 und Zwischengeschoss US2 und Zugang 5. Untergeschoss | | | 
| Bahnhof U8 Hönow/Ausbau zum Bahnhof US2 und Zwischengeschoss US2 und Zugang 5. Untergeschoss | | | 
| Bahnhof U8 Richtung Hönow, 5. Untergeschoss | | | 
| S+U Alexanderplatz, U8 | | | 
| U Karlshorstplatz | | | 
| Bahnhof U8, 1. Obergeschoss | | | 
| Bahnhof U8 (Ramp zu Durchgang) 1. Obergeschoss | | | 
| Bahnhof US2 (Ramp zu Durchgang) 1. Obergeschoss | | | 
| Durchgang (Ramp zum Bahnhof US2) 1. Untergeschoss | | | 
| Durchgang (Ramp zum Bahnhof US2) 1. Untergeschoss | | | 
| Durchgang (Ausbau der Ring/Carolinenahe-Stadt) 1. Untergeschoss | | | 
| Durchgang (Ausbau der Ring/Carolinenahe-Stadt) 1. Untergeschoss | | | 
| Zugang (Ramp) Ausrich der Ring/Carolinenahe-Stadt | | | 

Distance: 165 m

Distance: 207 m

Distance: 77 m

Distance: 55 m

Distance: 90 m

Distance: 21 m

Distance: 30 m
Example for usage the travel planner

- VBB has set up a accompanying service for elderly and particular mobility impaired people
- Uses VBB’s new travel planner continuously
- Important feedback!
Ongoing research and development: BAIMplus

- Design for all
- additional functionality based on personal profiles
- integration of dynamic routing due to delays and interruptions, escalator or elevator disturbances
- update of mobile services comparable to internet service
- Future oriented data maintenance (user groups / communities / web 2.0)
- Taking into account social networks
Project steps BAIM plus

**step 1:**
- Market research

**step 2:**
- Development of:
  - Web based services
  - Apps
  - Push and pull functions

**step 3:**
- Creating new and incorporate with existing communities to keep all the information actual
Market research I

- Research survey out of BAIMplus project
- Focused the older generation
  - Group 1: Seniors (65 plus)
  - Group 2: Best Age (from 55 to 64)
  - Group 3: Younger (until 54 years)

- To evaluate offered information and services in case of irregularities in public transport focused on mobile services.
Market research II

Precondition for attendance:
- Usage of mobile phone or internet one day per week
- Affinity to public transport

Number of interviews:
- all: n=269
- Senioren: n=79
- Best Age: n=80
- Younger: n=100
### Reasons for using mobile & non mobile internet

<table>
<thead>
<tr>
<th>Activity</th>
<th>Internet (%)</th>
<th>Handy (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Versenden/empfangen von SMS</td>
<td>92%</td>
<td>9%</td>
</tr>
<tr>
<td>nur zum Telefonieren</td>
<td>91%</td>
<td>12%</td>
</tr>
<tr>
<td>Versenden/empfangen von MMS</td>
<td>51%</td>
<td>10%</td>
</tr>
<tr>
<td>Senden/Empfangen von E-Mails</td>
<td>70%</td>
<td>4%</td>
</tr>
<tr>
<td>Spielen</td>
<td>47%</td>
<td>2%</td>
</tr>
<tr>
<td>Unterhaltung/Spaß</td>
<td>60%</td>
<td>3%</td>
</tr>
<tr>
<td>Informationsbeschaffung</td>
<td>30%</td>
<td>12%</td>
</tr>
<tr>
<td>Travel planner</td>
<td></td>
<td>26%</td>
</tr>
<tr>
<td>Informationen about details of trips</td>
<td></td>
<td>23%</td>
</tr>
<tr>
<td>Kaufen/Bestellen</td>
<td></td>
<td>67%</td>
</tr>
<tr>
<td>Reservieren/Buchen von Reisen/Hotels</td>
<td></td>
<td>69%</td>
</tr>
<tr>
<td>Booking tickets</td>
<td></td>
<td>46%</td>
</tr>
<tr>
<td>Kennenlernen/Kontakt finden</td>
<td></td>
<td>50%</td>
</tr>
<tr>
<td>Reservieren/Buchen von Veranstaltungen</td>
<td></td>
<td>42%</td>
</tr>
<tr>
<td>Online-Banking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mitmachen bei Versteigerungen (Ver-)Käufer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chatten</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Basis:** Gesamt (n=524); RMV (n=266); VBB (n=258) (Mehrfachantworten möglich)

**I3.:** Und Sie haben angegeben, dass Sie ein Handy nutzen. Wofür nutzen Sie das Handy?
Do you know the mobile travel planner?

<table>
<thead>
<tr>
<th>Gesamt</th>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>78%</td>
<td>22%</td>
<td>71%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RMV</th>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>29%</td>
<td>71%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VBB</th>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>15%</td>
<td>85%</td>
<td></td>
</tr>
</tbody>
</table>

Basis: Gesamt (n=525); RMV (n=266); VBB (n=259)

17.: Kennen Sie die mobilen Dienste des RMV/VBB, wie zum Beispiel die Fahrplanauskunft für das Handy?
### Information gaining?

<table>
<thead>
<tr>
<th>Topic</th>
<th>Vital</th>
<th>Usefull but not vital</th>
<th>Dispensable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arrival and departure time?</td>
<td>89%</td>
<td>10%</td>
<td>1%</td>
</tr>
<tr>
<td>How often interchange?</td>
<td>85%</td>
<td>13%</td>
<td>2%</td>
</tr>
<tr>
<td>Quickest journey?</td>
<td>74%</td>
<td>24%</td>
<td>3%</td>
</tr>
<tr>
<td>Actual delays?</td>
<td>71%</td>
<td>26%</td>
<td>3%</td>
</tr>
<tr>
<td>Most comfortable journey?</td>
<td>52%</td>
<td>41%</td>
<td>7%</td>
</tr>
<tr>
<td>Way to stop or station?</td>
<td>37%</td>
<td>49%</td>
<td>14%</td>
</tr>
<tr>
<td>How to find the platform?</td>
<td>22%</td>
<td>34%</td>
<td>31%</td>
</tr>
<tr>
<td>Helping staff available?</td>
<td>19%</td>
<td>50%</td>
<td>31%</td>
</tr>
<tr>
<td>How get on the vehicle?</td>
<td>11%</td>
<td>53%</td>
<td>31%</td>
</tr>
<tr>
<td>How to move in the vehicle?</td>
<td>7%</td>
<td>57%</td>
<td>31%</td>
</tr>
</tbody>
</table>

**Basis:** Gesamt (n=525)

**I8a.:** Welche Informationen sind für Sie besonders wichtig, damit Sie den öffentlichen Personennahverkehr optimal nutzen können?
What about pull services?

Basis: Personen, die sich zumindest teilweise für Pull-Dienste interessieren. (n=263); (n=99)

MD2.: (…) Wie groß ist generell Ihr Interesse an solchen Pull-Diensten, also an Informationen, die sie aktiv einholen?

MD2a.: Was finden Sie an Pull-Diensten, also dem aktiven Einholen von Informationen bei Bedarf nicht so gut?
What about push services?

Without profiling
- interessiert mich sehr: 17%
- 2: 25%
- 3: 27%
- 4: 18%
- interessiert mich überhaupt nicht: 14%

Profiled
- interessiert mich sehr: 14%
- 2: 24%
- 3: 26%
- 4: 17%
- interessiert mich überhaupt nicht: 18%

Information overflow: 27%
Permanent disturbance by sms: 17%
Wouldn’t be profiled: 16%
Costs: 11%
No need: 11%
Self determination of time of information gaining: 11%
Time consuming for filtering the important information: 11%
Too complicated: 7%
Missusage (getting advertisement): 7%
Not familiar with mobile technologies: 6%

Basis: Personen, die sich für mobile Dienste interessieren (n=370); (n=108)
MD 4a/b.: (...) Wie groß ist generell Ihr Interesse an solchen Push-Diensten, bei denen Ihnen automatisch Informationen zugesendet werden?
MD 5.: Was finden Sie an Push-Diensten, also dem automatischen Empfangen von Informationen nicht so gut?
### Willingness to install at mobile device?

<table>
<thead>
<tr>
<th>Installation on mobile device</th>
<th>Using browser</th>
<th>I don't know</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td>253</td>
</tr>
<tr>
<td>41%</td>
<td>30%</td>
<td>29%</td>
<td></td>
</tr>
<tr>
<td><strong>RMV</strong></td>
<td></td>
<td></td>
<td>121</td>
</tr>
<tr>
<td>38%</td>
<td>41%</td>
<td>21%</td>
<td></td>
</tr>
<tr>
<td><strong>VBB</strong></td>
<td></td>
<td></td>
<td>132</td>
</tr>
<tr>
<td>44%</td>
<td>20%</td>
<td>36%</td>
<td></td>
</tr>
<tr>
<td><strong>Senioren</strong></td>
<td></td>
<td></td>
<td>44</td>
</tr>
<tr>
<td>32%</td>
<td>34%</td>
<td>34%</td>
<td></td>
</tr>
<tr>
<td><strong>Best Ager</strong></td>
<td></td>
<td></td>
<td>63</td>
</tr>
<tr>
<td>30%</td>
<td>41%</td>
<td>29%</td>
<td></td>
</tr>
<tr>
<td><strong>Jüngere</strong></td>
<td></td>
<td></td>
<td>146</td>
</tr>
<tr>
<td>49%</td>
<td>24%</td>
<td>27%</td>
<td></td>
</tr>
</tbody>
</table>

**Basis:** Personen, die Push-Dienste mindestens teilweise interessant finden (Gesamt: n=253; RMV: n=121; VBB: n=132)

**MD6:** Wären Sie bereit, für diese (...) Pull-/Push-Dienste ein Fahrplan-Programm auf Ihr Handy zu installieren oder möchten Sie lieber den Internet-Browser Ihres Handys nutzen?
## Payment reserves for push services?

<table>
<thead>
<tr>
<th>Group</th>
<th>JA</th>
<th>NEIN</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gesamt</td>
<td>25%</td>
<td>75%</td>
<td>252</td>
</tr>
<tr>
<td>RMV</td>
<td>23%</td>
<td>77%</td>
<td>120</td>
</tr>
<tr>
<td>VBB</td>
<td>26%</td>
<td>74%</td>
<td>132</td>
</tr>
<tr>
<td>Senioren</td>
<td>32%</td>
<td>68%</td>
<td>44</td>
</tr>
<tr>
<td>Best Ager</td>
<td>36%</td>
<td>65%</td>
<td>62</td>
</tr>
<tr>
<td>Jüngere</td>
<td>18%</td>
<td>82%</td>
<td>146</td>
</tr>
</tbody>
</table>

**Basis:** Personen, die Push-Dienste mindestens teilweise interessant finden (Gesamt: n=253; RMV: n=121; VBB: n=132)

**MD7a.:** Wären Sie grundsätzlich bereit, für einen solchen Push-Dienst, der Ihnen automatisch Informationen sendet, Geld auszugeben?
Major results research study

The customer:

- Is interested in personalized services but wouldn’t get profiled
- Wants to have actual information but fears information overflow
- Wouldn’t pay so much for dedicated services
- Is focused on basic information, no additional stuff is wanted
Realized mobile services

...for iPhone
Realized mobile services

… for ANDROID, JAVA and BLACKBERRY
Realized mobile services

Visualization – optimized for mobile devices
Establishing of voice recognition system

- Implementation of speech based system in April 2011 based on developed BAIM/BAIMplus functionalities
  - Travel planner
  - Departure boards
- Integrated into VBB infocenter call line
- +49 30 25414141
Idea: user generated content

User generated data for barrier free walking paths

- Planned to use by wheelchair user or blind people
- Identifying of real used tracks
- Automated processing into a routing layer
- Generating a area wide routable layer

Wintec WBT-201
Storage: approx. 36 h logging
ca. 100 EUR
Different used tracks by different disabilities

- Track for blinds
- Track for wheelchairs
Test area
Test results

GPS-module in backpack

- walked path
- Qstarz
- RoyalTek
- Wintec
User generated content approach failed

By technical:
- Geo based path tracking with high accuracy
- Process for importing tracks into database is not user friendly

By stakeholder group:
- Reserved interest
- lack of technical skills
Next activities

Relaunch the VBB travel planer following the results of BAIMplus
• No login services on the web page, pre settings only by cookies or desktop widgets
• Integration of push services only in mobile applications
• Sustainable Integration of elevator and escalator status into the database
• Using “OpenStreeMaps” OSM for pedestrian routing
  - “Crowd sourcing” (ex. “user generated content)
  - Barrier free network enhancement by active (not only impaired) community estimated (e.g. www.sozialhelden.de \rightarrow wheelmap Berlin)
  - Using OSM framework for data mining and editing
Wheelmap.org
But solving all problems…

\[ \Leftarrow 1,60 \text{ m} \Rightarrow \]

\[ \Leftarrow 1,33 \text{ m} \Rightarrow \]

… is impossible.
Thank You

Alexander Pilz
Customer Information
Telefon: (030) 25 414 225
Hardenbergplatz 2
10623 Berlin

Department Head
Telefax: (030) 25 414 315
pilz@VBBonline.de

VBBonline.de