IBBT Tr@ins project
TRAIN IP Network Services

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UGent - IBCN
05/11/2008
Railway Interiors Expo, Amsterdam RAI

Tr@ins project
- Apr 2006 – Mar 2008
- Tr@ins = TR Ain IP Network Services
- Focus on
  - Technical
    - Broadband Internet
    - Onboard mobility support
    - Uninterrupted Internet
    - Quality of Service
  - Economical
    - User studies
    - Business model

IBBT Tr@ins project

Technical

Business model

Conclusions

IBBT Tr@ins project

Onboard network
- Horizontal handover
  - From Access Point to Access Point
  - Switch in < 50 ms for VoIP
Trackside network: WLAN Fast Handover

Fast Roaming WLAN Switch for Rail Systems

Roaming time
Average 5.64 ms
Std. dev. 0.06 ms

5 QoS classes:
- QoS classes are mapped on outgoing links
- (Load balancing)
- Interactive: VoIP call
- Priority: Crew Comm.
### Forecasting

**Passenger forecasting**

- Increase in passenger numbers over time.

#### Adoption

- **Data**: 2000-2020
- **Graph**: Bar chart showing adoption rates across different time periods.

### Technology assignment

- **Table**:
  - **Columns**: Specific cases, Wireless data networks, Mobile networks, Satellite networks.
  - **Rows**: Case 1, Case 2, etc.
- **Details**:
  - Case 1: **Outdoors**
  - Case 2: **Indoors**

### Technology mapping

- **Map**:
  - **Networks**: UMTS, WIMAX

### Cost parameters

- **Table**:
  - **Categories**:
    - Train equipment: Outdoor antenna, Indoor network, **RNC**
    - Network equipment: Trackside network, **HPC**
    - General costs: Head office, Sales, **Billing**
    - Network operation: Maintenance, **Repair**
    - Network connection: **Outdoor link**

### Revenue schemes

- **Ticket types**
  - Prepaid cards per hour (e.g., hotspot service)
  - Monthly subscriptions
- **Ticket price**
  - Prices: £2.9 to £3.9 (95-155 kbps)
  - Service of 30 Mbps: Prepaid $3.4, Subscription $18
- **Two revenue scenarios**
  - First class free internet, second class paying
  - **Model switch** from 1st to 2nd class

### NPV analysis (10 years, 15% discount rate, 1st class free internet)

- **Graph**:
  - **Lines**: UMTS, WIMAX, WIMAX + UMTS, **Satellite**
  - **Data**:
    - 30 Mbps per individual user
    - User experience of 2.1 Mbps
Summary 1

When more bandwidth is guaranteed to the customer:

- **UMTS cases**
  - Only UMTS: Problems → No CoS
  - Combination with WiMAX: CoS can be guaranteed
  - Pre-installation WiMAX: more optimized network rollout

- **WiMAX case**:
  - Only interesting for large bandwidth

- **Satellite cases**:
  - UMTS as gap filler: bandwidth problems
  - 1Way Satellite: uplink bandwidth problems (UMTS)
  - 2Way Satellite: less dependent of bandwidth

Summary 2

- Combination of technologies required
  - Dense railway network: UMTS + WiMAX
  - Rural railway network: Satellite solutions

- **Business case**
  - Positive case in Belgium is possible
  - Influenced by many factors
    - User forecasting, rollout scheme, offered bandwidth
    - Business models
  - Role and participation of the partners important

Thank you!

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WEDNESDAY 5 NOVEMBER DAY 2 – AFTERNOON SESSION

MODERATOR - Dave Gorskov, CEO, Digital Grape

The networked railway – developments, passenger infotainment and future applications

13.05 Train communications for passenger entertainment, operational applications and enhanced security – where are we today and where next?
Nomad Digital – Jay Saw, commercial director
Jay Saw will outline developments in the continued evolution of train communications for passenger entertainment, operational applications and security enhancements, particularly focusing on the past 12 months. The primary aim will be to communicate the successes made and what the future holds.

13.30 WiFi on trains – making the business case
Lloyds Register Rail Europe – Hans de Graauw, senior consultant
How a shared infrastructure can lower costs per application and still meet all the requirements, while making the best use of scarce resources and making upgrading of vital components easier as well.

13.55 IBBT Trains project
Ghent University – IBBT – Jan Van Gotehegn, researcher & Daan Pareit, PhD Student
The IBBT Trains project has studied broadband wireless access solutions for train commuters, dealing with movements of passengers and crew in the train and high-speed movements of the train, from a technical as well as a business perspective.

14.20 Mobile digital signal – why digital signage has finally reached into the trains and buses of today
Inova Multimedia GmbH – Frank Lichonski, managing director
The latest developments in wireless communication and affordable mobile screens have made it possible to reach the captive audience inside our public transportation systems. Who is profiting from this development and what precautions are being taken?

14.45 Portable media on the rails – PMPs give passengers freedom of movement, choice and connectivity while riding the rails. The diversity available in modern devices presents options for entertainment as well as for business practices. ITE is as robust as IPE!
dg2box – Brian Lynch, vice-president, sales
This presentation will discuss, revenue share models, distribution and collection, establishing provisioning assets for large rail networks, labour-reduction initiatives, content selection for movies, music, TV, video games, price point initiatives and luxury packages.

15.10 Private branded online entertainment store for in-station/on-board kiosks – downloading and custom DVD burning
Raging River – Wes Barth, president
Five years ago the principals of Raging River developed the very first portable video hard drive players for the airline industry worldwide and railroads in North America. This presentation looks at state-of-the-art solutions for infotainment on board.

15.35 FORUM FINISH

16.00 Presentation of the Railway Interiors Expo ‘Innovation and Excellence’ Awards followed by the winners’ drinks party

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UPDATED PROGRAMME

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