In-Time: Multimodal Real-Time Travel and Traffic Information to Improve Modal Choice and Energy Consumption in European Cities

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Motivation, problem area

• Increased traffic in Europe’s cities has resulted in
  – chronic congestion (delays, pollution)
  – economic loss of nearly €100 billion/year (about 2% of EU's GDP)

• Urban traffic responsible for
  – 40% of CO₂ emissions and
  – 70% of emissions of other pollutants arising from road transport


Main policy objectives for transport and travel

- cleaner,
- more efficient, including energy efficiency
- safer and more secure

Motivation, problem area

**Multi-modal** Travel and Traffic Information Services
- **Reliability** (up to date info about delays, service changes, …)
- **Comfort** (short transit, improved waiting time…)

→ positive impact on travel behaviour: **co-modal choices**
→ **pan-European** multimodal Real-Time Travel Information

→ **ITS Directive**
→ EU-wide multimodal travel information services
→ EU-wide real-time traffic information services

http://www.bayerninfo.de
http://www.netzwelt.de/images/articles/handy-navigation_1176551258.jpg
Travel & Traffic Information Services

Motivation, problem area

- Local content/service providers
- Content/service integrators
- Travel Information Service Providers (TISPs)
- End Users

Other Data Sources
Motorway Operator
Road Operator
Public Transport Operator
Urban Traffic Management Operator
Parking Operator
RDSS Regional Data / Service Server (site level)

TISP

TTIS by “global players”: a current trend, e.g.
- Google
- Tom Tom
- ...

TTIS on smartphones: a growing market (Frost & Sullivan, 2011)
- 280.000 users in Europe (DE, FR, ES, IT, NL, UK)
- 2.2 millions by 2017
Multimodal Travel & Traffic Information Services: **challenges**

- Need to provide **open data access**
- Different **local technologies, data formats, interfaces**
- **Specific B2B agreements** (technical, operational)

- **Cross-domain** contents/services:
  - Different EU **ITS standards** available (in use, evolving)
  - no “**fit for all**” model/interface available
  - data model “**harmonisation**” approach needed
    - see e.g. **ISO TR25100** …
Motivation, problem area

Multimodal Travel & Traffic Information Services: **scenario**

- **A**: Planning & pre-trip information
- **B**: On-trip navigation
- **C**: Public Transport Journey Description
- **D**: On-trip navigation

- **End User**
  - Desired destination

- **TTIS provider**
  - Route planning (car, walk)
  - On-trip navigation

- **Local Systems**
  - PT Journey Planning
  - PT info (static, dynamic)
  - Parking info (static, dynamic)
  - Traffic events
The In-Time project

In-Time: Intelligent & Efficient Travel Management for European Cities

- CIP-ICT PSP-2008-2, *Type B Pilot*
- 22 Partners, co-ordinated by AustriaTech
- Budget: 4.58 M€, of which 2.29 M€ funded by the EU
- Kick-off 1st April 2009, duration 3 years
- 6 EU cities: Brno, Bucharest, Florence, Munich, Oslo, Vienna

www.in-time-project.eu
Research objectives

In-Time: Intelligent & Efficient Travel Management for European Cities

• A general service infrastructure providing:
  o **harmonised access** to data and services
    ⇒ EU ITS standards
  o bundling all transport info in a city
  o general infrastructure services
    (e.g. catalogues, registries)
  o **no additional logic**
    ⇒ data/services remain with Local Systems and/or TISPs
  o **Pilot in 6 EU cities**
    ⇒ Vienna, Munich, Oslo, Florence, Bucharest, Brno
Enabling **interoperability** across **sites** and content/service **sources**
The In-Time Infrastructure: a Service Oriented Architecture (SOA) for harmonised access to TTI Services

- **B2B Commonly Agreed Interface** (B2B CAI) to access local TTISs
- General **infrastructure services** (Registry, Catalogue)
- 3 standard domains: (1) **SOA** (W3C), (2) **ITS**, (3) **Geospatial** data (OGC)

**RTTI support Services**

- **Data Services**
- **Routing Services**
- **Map Services**
- **Message Services**
- **Location Services**
- **Registry Service**
- **Catalogue Service**

**In-Time End User Services Taxonomy**

**Mandatory Core Services**
- static road traffic information
- dynamic road traffic information
- static parking information
- static public transport information
- walking information

**Core Services**
- dynamic road traffic information (secondary roads)
- dynamic public transport information
- dynamic public transport journey routing
- dynamic parking information
- enhanced walking planning
- dynamic cycling planning

**Add-on Services**
- dynamic freight information
- dynamic POI information
- dynamic traffic event information
- dynamic weather information
- static and dynamic flight information

**CAI Services Taxonomy**
The In-Time B2B Interface (CAI): specifications

1. **In-Time Data Model**
   - defined harmonizing several international and European standards
     - DATEX 2, TPEG, IFOPT, SIRI, JourneyWeb, OpenLS, ISO 19000 / OGC standards, ...
     - along the lines of the ISO 19100 Geographic Information Standards
   - encoded in Unified Modeling Language (UML)

2. **In-Time Service Model**
   - uses, wherever possible, existing service standards especially from OGC (WMS/WFS) and OASIS
   - automatically translated into WSDL documents describing the interfaces

3. **Exchange format** for In-Time data
   - defined by an Application Schema of Geography Markup Language (GML).
The In-Time B2B Interface (CAI): implementation

- **Core component:** Data Service
  - Data transformation from local data/service format to In-Time harmonised data model
- **Built on top of existing systems**
  - No need of internal modification of existing services
- **Deployment flexibility**
  - wrt service distribution → policy/service/business requirements
- **Modular and scalable**
  - Data services can be added in stages
- **Platform independent**
  - open standards, neutral wrt implementation technologies
Major Outcomes/Results

In-Time deployment in 6 European pilot cities

- **B2B CAI** (6 instantiations; see online data/services @ www6.softeco.it/Mixer)
- In-Time **Registry & Catalogue** (Tom Tom BV)
- 4 TISP **mobile apps**
Major Outcomes/Results

In-Time deployment in 6 European pilot cities: Florence

Local systems / contents

1. ATAF
   - AVM System

2. ATAF
   - BUSBSSOLA
     - Journey planner + POIs

3. Firenze Parcheggi
   - Traffic Events & Road works
   - Parking data

4. Tom Tom BV
   - Routing Service (car, walk)

In-Time B2B Services

- In-Time Data Adapter (Public Transport static and dynamic information)
- In-Time Service Adapter (PT Journey Planner + walking info)
- In-Time Data Adapter (Traffic Event Information)
- In-Time Data Adapter (static and dynamic Parking Information)
- In-Time Data Adapter (Routing Service car, walk)

In-Time B2C Services

- GeoSolutions App (Win Mobile)
- Telmap App (Symbian)
- Fluidtime App (iPhone)
- Softeco App (Android)
Conclusion and outlook

• In-Time **pilot demonstration** ongoing in the 6 cities
  – about 1000 users
  – running until March 2012
  – Follow-up project: **Co-Cities**

• In-Time is **open to new cities/regions/TISPs**
  – The **In-Time Follower Package**
  – [www.in-time-project.eu](http://www.in-time-project.eu)

• In-Time enabled **mApps**
  – iPhone, Android mktplaces
Thank you!

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