Practical DATEX experiences from productive environments

DATEX II User Forum
20/21 March 2012 - Stockholm

HEUSCH BOESEFELDT
Brains for roads

Contents

- ➤ **Heusch/Boesefeldt – the company**
- Car2X experiences from sim^{TD}
- Demonstration of NDWviewer

Heusch / Boesefeldt
The company

- Intelligent transport systems by Heusch/Boesefeldt observe, analyse and control traffic - for a better traffic flow, safe highways and reduced emission.
  - With experience of more than 30 years in traffic management and information we do consulting for road operators and support 60+ installations European-wide. We are esteemed by our customers as specialist for individual software solutions and systems integration
  - founded 1969 in Aachen, Germany
  - ~40 employees

Heusch / Boesefeldt Portfolio
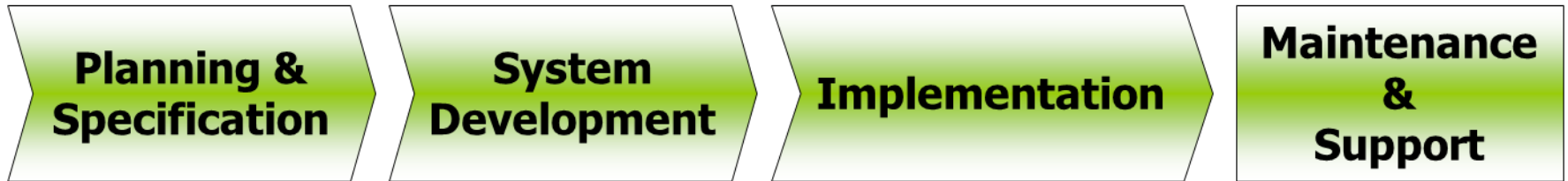
- Traffic Control Centres for Trunk Road Networks

- Active Traffic Management Software

- Traffic Information Centres

- Data Exchange (national, international)

- Internet Traffic Information

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Overview sim^{TD}

- sim^{TD}: Safe Intelligent Mobility Test field Germany
- Project web site: www.simtd.de
- Pilot project for
  - evaluation of Car2X technology and
  - impact of Car2X communication
- Joint project of car manufacturer, automobile supplier, telecom companies, research institutes and the public sector
- sim^{TD} Test Center was developed by Heusch/Boesefeldt

Data flow sim^{TD}: Overview
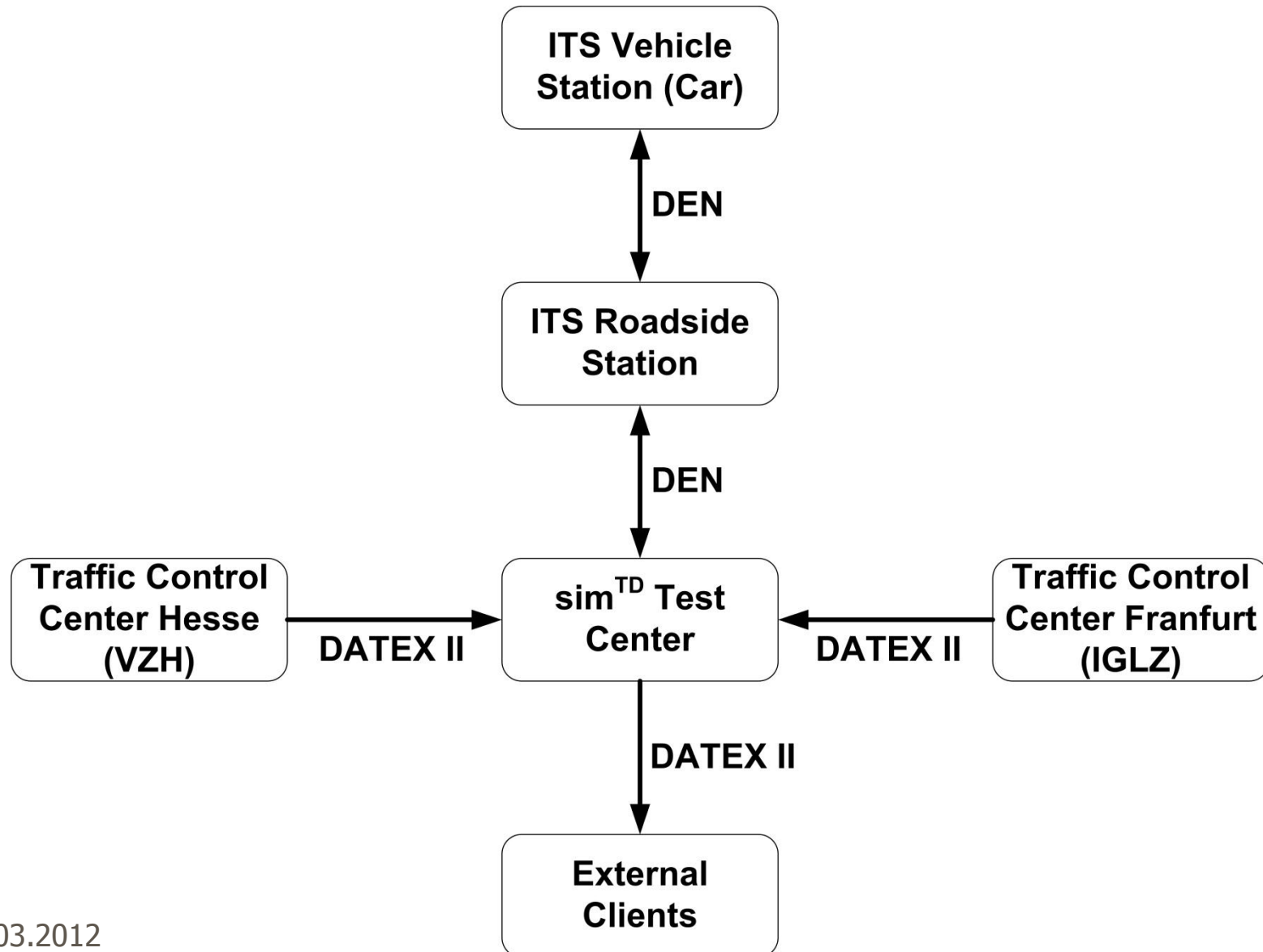
Data flow sim^{TD}: Test Center receives DATEX II publications

- Traffic Information are obtained from Traffic Centers Hesse and Frankfurt, such as
  - Weather data,
  - Roadworks,
  - Abnormal Traffic,
  - Accidents, ...

- situationRecords are stored as XML in database to avoid loss of (maybe unknown) DATEX II Extensions
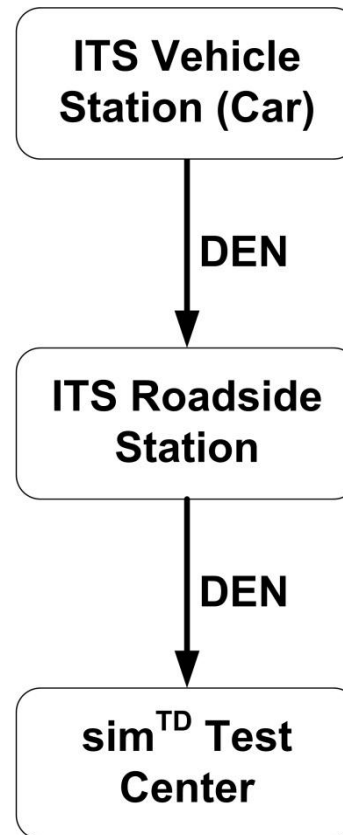
Data flow sim^{TD}: Car2X

- Car generates data and sends DEN message to Roadside Station
- Roadside Station forwards DEN message to Test Center
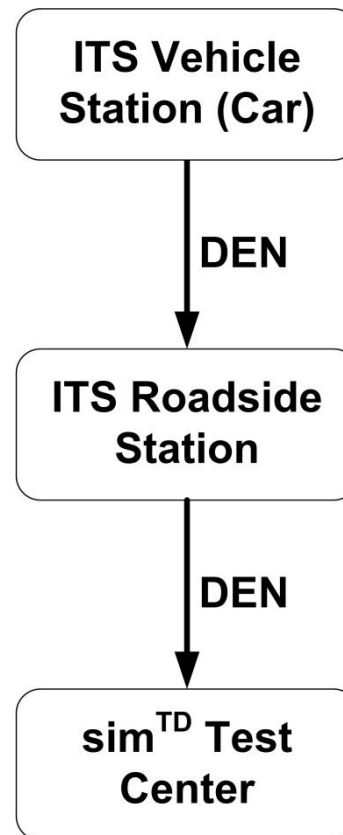
- Examples:
  - Location as GPS track
  - Abnormal Traffic
  - Emergency Brake
  - Accident
  - Roadworks
  - Objects on the road
  - Weather conditions
  - ...

Data flow sim^{TD}: Test Center receives DEN message

- GPS track is mapped to GDF map
- DEN code is mapped to DATEX II situationRecord type

```
┌─────────────────┐
│  ITS Vehicle    │
│  Station (Car)  │
└─────────────────┘
         │  DEN
         ▼
┌─────────────────┐
│  ITS Roadside   │
│  Station        │
└─────────────────┘
         │  DEN
         ▼
┌─────────────────┐
│  simTD Test     │
│  Center         │
└─────────────────┘
```

- situationRecord is stored as XML in database

Data flow sim^{TD}: Data merging

- Data from vehicles and Traffic Centers is collected in Test Center Database
- Some data is merged:
  - Weather data
  - Level of service

sim^{TD} Test Center

Data flow sim^{TD}: Test Center sends DEN messages to Cars

- Generic filter config defines which records are published
- XPath as query language to filter situationRecords

ITS Vehicle Station (Car)

↑ DEN

ITS Roadside Station

↑ DEN
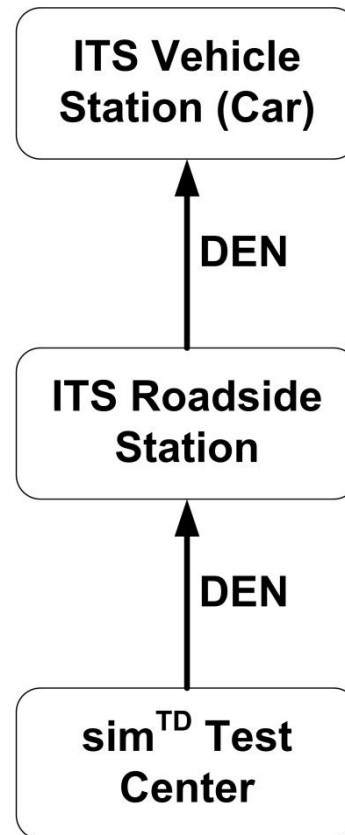
sim^{TD} Test Center

- Future Level-B Extensions can be mapped to DEN without software changes

Data flow sim^{TD}: Test Center publishes DATEX II

- Test Center publishes
  - measuredDataPublication for level of service
  - situationPublication for other traffic information

DATEX II in sim^{TD}: Pitfalls
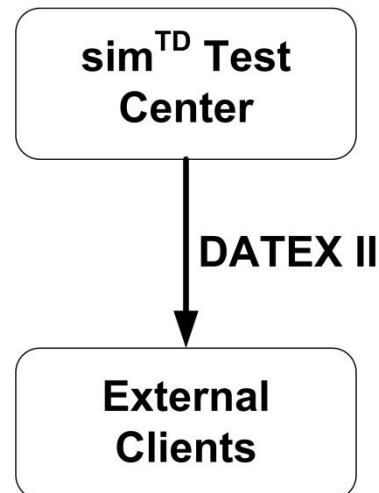
- ## Generating DATEX II publications
  - GPS-Tracks within urban road networks cannot be represented in DATEX II without using Extensions
  - LinearByCoordinates as Level-B Extension necessary

- ## Handling arbitrary DATEX II data
  - Possibility of Extensions makes it difficult to store and handle DATEX II data in a relational model
  - Generic approach necessary
    - Store DATEX II native as XML
    - Use XPath to dynamically apply filter and publishing rules

DATEX II in sim^{TD}: Conclusion

- Flexibility of DATEX II Level-B Extensions is both boon and bane:
  - Extensions are needed for LinearByCoordinates, but
  - Data modelling is complicated by them
- DATEX II stands the test of Car2X data aggregation and publication
  - No serious obstacle for using DATEX II in Car2X environments
  - After overcoming initial difficulties, DATEX II gives the familiar benefits of a standardized and widely used format

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- ➢ **Demonstration of NDWviewer**

NDW

- NDW: National Data Warehouse for traffic information of the Netherlands
- Collecting, storing and publishing national traffic data
  - Traffic flow
  - Local speeds
  - Travel times
  - Roadworks
  - Infrastructure status
  - Traffic information

NDWviewer

- Browser based visualization of NDW data
- Adds traffic information from Germany and Belgium
- Data sources are DATEX I (OTAP) and DATEX II
- Developed by Heusch/Boesefeldt
- Purposes:
  - Visual demonstration of data quality and quantity
  - Quality assurance of data, especially location referencing
  - Used as Traffic information system within traffic centers

Demonstration

NDWviewer: Conclusion
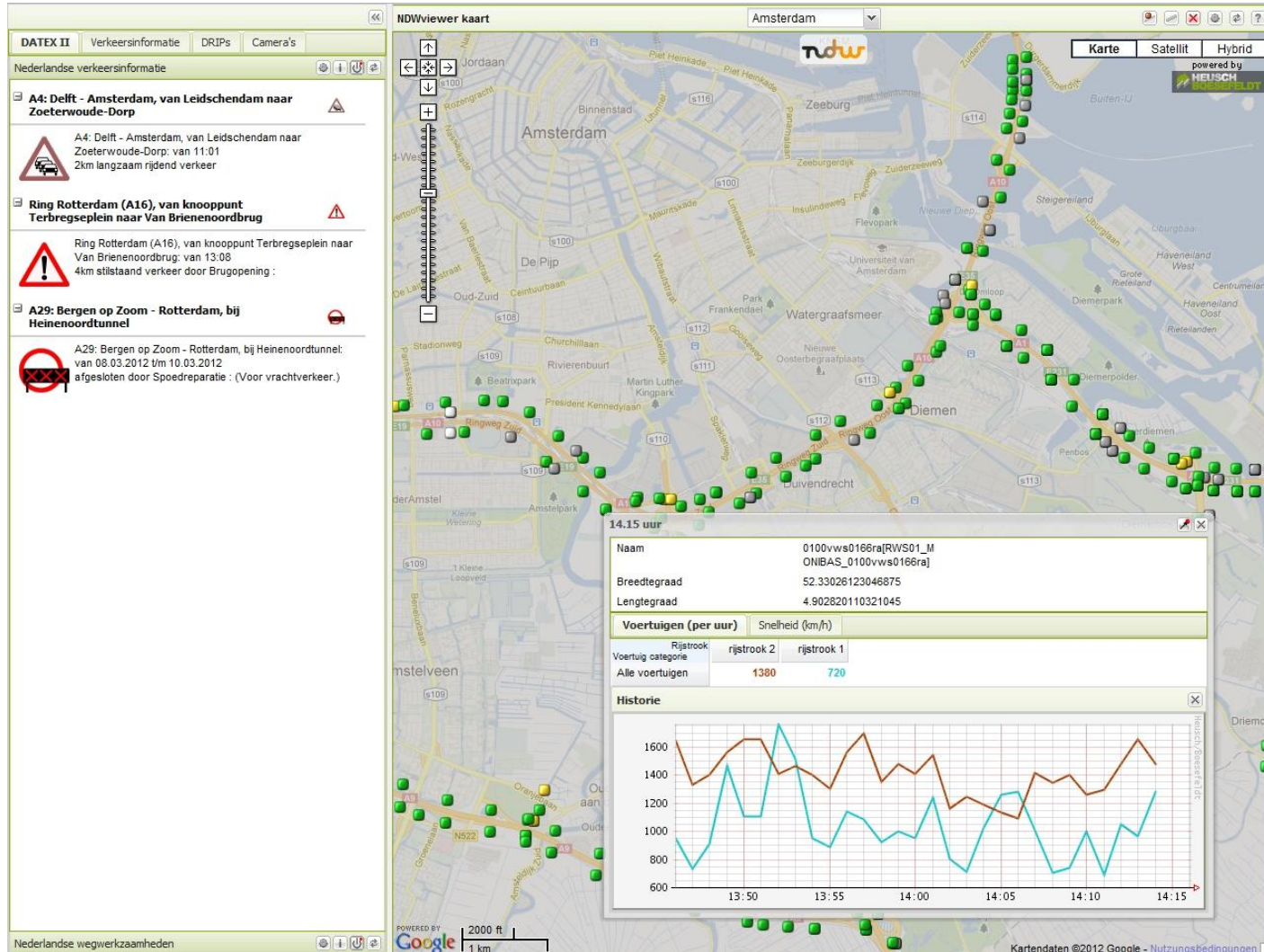
- DATEX protocol and format allow standardized collection of data
    - Exception: Standardized LinearByCoordinate is missing
- Extracting and visualizing 120 000 data values per minute from XML require both rapid and solid implementation

THANK YOU FOR YOUR ATTENTION!

QUESTIONS?

Dipl.-Inform. Sebastian Brandt, MBA
Heusch/Boesefeldt GmbH | Tempelhofer Str. 4-6 | 52068 Aachen, Germany
www.heuboe.de