Building of Intelligent Transport Systems

Berthold Jansen
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Simply put together
- Computer
- Software Platform
- Traffic Algorithms

Don't do it this way!
Put the cart before the horse!

Imagine

You have already built and installed an Intelligent Transport System

Now what?

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You have to run it.

Operating

Services

Organisation

Goal settings:

High quality of traffic performance

Cost effective

Developable

Maintainable
Deploy single, isolated, but optimized systems?

Not this way!

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Solution

One Centre, One Software

Central Data Management

Detectors

- Multiple use for
  - Local traffic management
  - National rerouting
  - Traffic information (RDS-TMC, TPEG)
  - Statistics
  - Forecast

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Traffic detection points using means like loops, cameras

Other detections than traffic, like weather (fog, ice, precipitation etc.)

Variable message signs

Variable direction signs

System Architecture for Automatic Detection and Control

Traffic Control Centre

Subcentre

All Intelligence is here

Intelligent software & tools for
  • Area wide traffic management (network control)
  • Automatic rerouting
  • Consideration of roadwork
  • Creation of TMC-Messages

Intelligent software for
  • Data completion
  • section-wide interpolation
  • fallback strategies
  • Forecast
  • etc.

Out-Station

Variable Message Signs

Detection (Loops, cameras etc.)

Alternative Routing

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Content-related Structure

Monitoring

- Successful traffic management requires the best achievable knowledge about the actual traffic situation. This concerns both, the current traffic situation as well as predictions.

Optimisation

- Based on the current and predicted traffic situations, an improvement of the traffic flow can be achieved using appropriate traffic control methods.

Traffic Control

- In order to locally improve traffic flow our systems use various methods to analyse sensor data for traffic and environment and determine control measures that can be triggered automatically.

Safety

- Increasing traffic safety is a major objective of our systems. One way this can be achieved is by reducing the risk of accidents using traffic control and hazard warning.

Information

- Traffic information as a service of the road operator pays off twice. Well informed road users are satisfied customers, and they take their own decisions: they avoid congestion and help preventing accidents.
Service oriented architecture (SOA) based on SOAP web-services
- easily scalable if all implemented services are „stateless“
- individual, customer focused integration of components
- Proven and mature components from different domains can be plugged together and can be integrated into a new, tailor-made - to region and costumer - system
Special ITS – Feature - Hybrid Architecture -

- DATA-BUS serves for the high data traffic
- SERVICE-BUS serves for easy integration of functionality
Essential functionality

Geo-Data Service
- Conversion between all reference systems
  - Metering / mile posting
  - RDS-TMC location references
  - TPEG-LOC
  - OpenLR
  - UTM / WGS 84 (e.g. mobile data from moving cars)
- Location referencing via “on-the-fly” map matching
  - more simple configuration process
  - easy interfacing to external systems
Coming back to the goal-settings

Cost effective:
- One (1) centre
- 24/7/365 operating on one place, one equipment, one human resource

High quality of traffic performance:
- Traffic engineers optimize all parameters in one place, with one standard

Developable:
- Start with a first installation
- Learn, optimize, enhance the system (on basis of the same architecture)
- Extend the infrastructure over time, independent from new software development

Know-how is concentrated at one place
Example
National Traffic Management System

Traffic Management and Information Centre for Highways and Expressways in Austria - TMIC

Operator: ASFINAG
Responsible for 2,175 kilometres of highway
Integration of 10 regional subcentres

> 1382 detection sites, 4006 sensors
> 1295 gantries carrying
> 6943 variable message signs VMS

Archive is growing 7.9 GB per day
Archive contains 2.312 TB

Tunnel centre data integration
Actual and predicted traffic situation
Traffic control
Traffic information
Road works management
Traffic analysis system
Data exchange with other countries (Italy, Germany, ...)
Message management
TMIC ASFINAG
Results
We built the system on basis of the core software GeoDyn2® together with mature components into a new, costumer-oriented system.

More than 20 years of experience contribute to GeoDyn2®

GeoDyn2®:
- Geo – Handling of geographic data
- Dyn – Handling of dynamic mass-data
Why did the ASFINAG chose HB

- Experience in planning, developing and successful operation of TMC
- Handling of mass data
- Specific traffic engineering know-how
- Ability to integrate new technology
  - e.g. Cooperative traffic management (Car-2-car, Car-2-Infrastructure communication) - each car is sensor and actor
Thank you very much for your attention!

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