CO-OPERATION TRAFFIC MANAGEMENT AND TRAFFIC INFORMATION

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Abstract

Traffic Management acts as a roof application for various traffic-related systems. A Traffic Management System (TMS) integrates these systems into a single application allowing either the direct control or the generation of control recommendations to the various subsystems from a centralized source. Traffic Management thereby provides the basis for cross-system traffic strategies and for the distribution of traffic information. The value chain for integrated traffic management and traffic information has to be build by traffic data collection from various sources, the data qualification, aggregation and completion, the intelligent processing of traffic data, and the use of the real-time traffic situation as well as the traffic forecast estimation for traffic management and traffic information requirements. Some European project examples, based on Public-Private-Partnership (PPP), illustrate the responsibilities shared by the involved parties. Joint forces given by PPP projects leverage the deployment of TMS and Traffic Information services. The responsibilities allocated to the parties have to be well-regulated in the project contracts, but PPP contracts are unique, far away from standardization. Nevertheless some basic responsibilities are defined definitely.

Main Text

Traffic Management acts as a roof application for various traffic-related systems. These systems are often run in independently from each other and often by different jurisdictions. A Traffic Management System (TMS) will integrate these systems into a single application allowing either the direct control or the generation of control recommendations to the various subsystems from a centralized source. This approach allows for a high level of automation and cross-system traffic strategies, leading to the optimal collaboration between all relevant systems.

Typical subsystems a city runs are freeway systems, public transit information systems, urban traffic control systems, parking systems, roadwork systems, etc. The important point is that a

TMS can integrate these systems in real-time. Strategies defined in the TMS will act upon changes in data delivered upstream. Combinations of traffic data, e. g. delivered from the traffic control systems and public transport data could, for instance, trigger the display of text on a dynamic message sign.

We identified six rough themes of Traffic Management, each delivering different kinds of value to a Traffic Management customer:

1. Achieve collaboration and central control of existing, independent traffic subsystems
2. Comprehensively monitor and visualize traffic conditions in real time
3. Provide value-added traffic information services to the public
4. Improve road safety through incident detection and response management
5. Prevent and actively fight congestion by intelligently influencing traffic on the road
6. Demonstrate civil responsibility through a pro-active approach to traffic improvement

The TMS provides a vast variety of tools to the user. It visualizes the data received from upstream systems facilitating the monitoring of the connected systems, most commonly via map visualization. It provides tools to define cross-system traffic strategies. Most commonly these strategies are defined by the use of logical combinations of input data.

In addition, a TMS generates vast amount data (raw and aggregated), which can be later on used for analysis and planning purposes. A TMS often has direct control interfaces to the connected subsystems, making it a central control terminal behind which all subsystems are hidden. A TMS can use the current traffic data to produce traffic forecasts, which could be helpful for deciding about certain traffic control measures, but also for route planning functionality provided to the public. By reporting incidents such as congestion or accident the TMS facilitates the ad-hoc intervention by the operator. Finally, the TMS serves the purpose for disseminating the collected data and distributing it to various sources, such as an internet portal, fax services, SMS.

Traffic data collection from various sources is the first step to cover the total value chain for integrated traffic management and traffic information. The data qualification, aggregation and completion, as well as the intelligent processing of traffic data for both, first to achieve an overview of the real-time traffic situation, and second to estimate the traffic forecast is the second step within the value chain. The use of data for traffic management and traffic information purpose finalize the total value chain.

There are some Public-Private operation models for Traffic Management and Traffic Information in Europe in place. Some German examples are:

1. The Traffic Management and Information System in Berlin
   ("VMZ Berlin")
2. The Traffic Management and Information System in North Rhine Westfalia
   ("Ruhrpilot")
3. The Traffic Management and Information System in Bavaria
   ("VIB Bavaria")

In Berlin, focus is on the integration of traffic control and traveler information as well as on the integration of dated and new systems. Since 2003 the VMZ Berlin is operated as a PPP, providing a variety of mobility management services, such as intermodal traveler information and route optimization for private and business customers, and traffic and mobility monitoring for the local transport planning and management authorities. Shortly after the start of operation of the VMZ, the city of Berlin commissioned the renewal of its traffic control system ("VKRZ") and its integration, together with the VMZ, into a modern transport management center. The two systems contribute to traffic management with a different focus:

- VMZ collects traffic data in order to derive an up-to-date picture of mobility conditions in the metropolitan area, which is transmitted to several groups of users via different channels.
- VKRZ's responsibility is essentially to monitor and control traffic in the urban and expressway networks, to detect the occurrence of incidents, and to respond with appropriate measures for traffic control, and when needed the disposition of emergency vehicles.

A large degree of integration between the two systems is achieved through a common database, which contains all data that are relevant for both systems.

The objectives of the Ruhrpilot project are to improve mobility and transportation safety by building upon three levers:

- Monitor mobility conditions (road and rail traffic, private and public transport, and freight)
- Provide mobility services
- Define and deploy cross-jurisdictional environmental-friendly transportation management strategies, which involve a large number of public authorities and potentially affect travelers and private agencies across the whole region.

The complexity of the Ruhrpilot project derives in large part from the variety and the inter-connection of the various forces in play, which can be summarized as commercial-, administrative- and technological tasks.

Joint forces given by Public-Private Partnership (PPP) projects leverage the deployment of TMS and Traffic information services. The responsibilities allocated to the parties have to be well-regulated in the project contracts, but PPP contracts are unique, far away from standardization. Nevertheless some basic responsibilities are defined definitely:

- The responsibility in the design and build phase is shared by both partner.
- The responsibility during the operation and service provision phase is divided. Public authorities are responsible to operate traffic control systems and more ore less traffic management systems. If public authorities provide traffic information services they have a focus on free of charge service, this mean non-commercial services. The private partner has a commercial interest to provide value added traffic information services to generate a revenue stream to cover the operation and maintenance costs for such management or information systems.

To summarize:

To develop and operate traffic management, information and control solutions:
- Integration is more than the sum of single parts
- Use the same platform to integrate traffic management-, information- and control applications and feed these applications from the same database

Be aware of the various aspects of integration:
- Functional
- Spatial/regional
- Old and new transportation systems

Lessons learned:
- Develop PPP contracts with high accuracy, tailored to the project specifics
- Preserve and integrate existing infrastructure
- Take into account the local transport policy and political guidelines