The National Transport and Information Center

Slovak Republic Government Resolution No. 22/2009 is introducing support for the development of intelligent transport systems in Slovakia through the project for a National System of Transport Information (NSDI). Hence, the National Transport and Information Center (NDIC) stands as an essential component of the NSDI. The aim of the system is to reduce the accident rate and travel time in urban areas, increase safety, and reduce traffic jams and emissions. The NDIC is a unique technological solution and a top central workplace at the same time. Creating the central control system and centralizing all traffic and transport-related data constitutes an effective environment helping to make objective decisions of operational and strategic importance.

Situation

There are many separated information systems (IS) in Slovakia. These systems partially or marginally process traffic or transport-related data many times without operators being aware of this aspect of their information systems. The main operators of information systems working with traffic information are the Slovak Road Administration and the National Motorway Company. These together run more than 10 specialized systems operating at different levels. The exchange of data between these information systems is often indirect and complicated or does not exist at all. The poor information exchange often leads to redundancy or even the omission of events. The actual status does not hinder the existing information systems from operating in any way as these are mostly highly specialized solutions meeting their purpose. However, Slovakia actually does not make use of one central communication point for voices, nor data communication in the area of transport.

With the aim of changing this situation and in accordance with Commission Directive EC 40/2009, the implementation of the Pilot Project of the National Transport and Information Center (PNDIC) was started. The project was supposed to provide answers on the possibility of implementing modern information technologies and standards in the transport sector in Slovakia.

Objectives

After the PNDIC's creation, mainly the answers related to the implementation of modern IKT in the area of transport were expected to be addressed during the project's determination. In particular they wanted to see if it was possible:

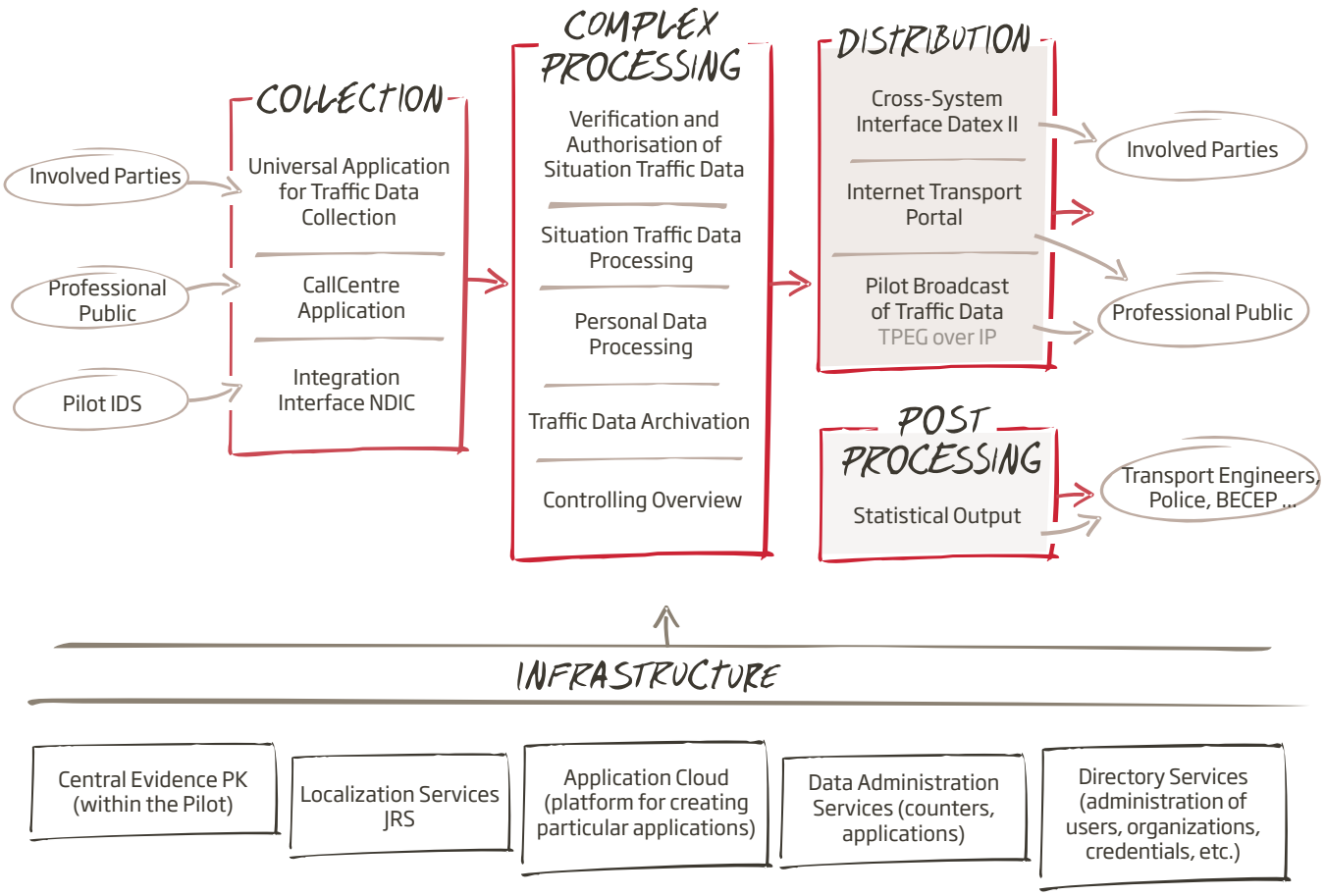
- To connect relevant information systems generating traffic data within one solution, without the need of changing its implementation in order to create the central administration of traffic data within the Slovak Republic
- To create a unique user environment for all operators and controllers and to provide them with a complex set of tools for the processing and administration of traffic data
- To implement uniform rules for processing traffic data within parties participating in the life cycle of traffic data (reporters, police, controllers, engineering network operators, etc.)
- To publish verified traffic data from one central point through various channels (WS, TCP/IP, radio signal, Web portal) and use existing as well as new standards (Datex II, TMC, TPEG)
- To create the central controlling facility for different parties involved in the process of the creation or administration of situational traffic data without a suitable information system available
- To handle all the issues within the specified time frame of nine months

Solution

It was necessary to cover comprehensively different areas of the application's structure:

- To integrate existing external agenda systems
- To create a consistent application environment that included several applications
- To create distribution interfaces for traffic data
- To create an internal integrating environment
- To create a public website

Solution Logic Structure



At the same time, it was necessary to connect several existing agenda systems providing traffic data:

- Traffic information system of the National Motorway Company (NDS)
- The Borma NDS information system
- TDM NDS system
- IDS Trnava system
- RWIS/MDSS system for Slovak Road Administration
- The Slovak Hydrometeorological Institute system
- Other

Expecting the connection of additional diversified agenda systems and considering data flow volumes mainly in the area of traffic data, the fast and cheap connectivity and scalability was stressed during implementation. These requirements were met by utilizing the BizTalk Server as an integration platform.

Creating a consistent application environment (Cloud) the emphasis was put on the modularity (with the perspective of the creation and operation of other specialized applications in the area of traffic data) and again on the scalability of the solution.

Considering the demands for the application's user interface, the crucial points were high-class ergonomics, the fast response time of the user interface, the desktop adaptability for particular working positions, the contextual linking of widgets, and the widest possible interoperability. The Internet Browsers and HTML were the obvious choices but at the same time we rejected rendering on the server-side and decided to create a full client JavaScript framework with accelerators.

The following were created within the consistent application environment:

- **Universal Application** – the application for traffic data collection for involved parties without a suitable information system
- **Controller Application** – for the processing, administration and publication of traffic data
- **CallCentre Application** – the application for traffic data collection through a call centre
- **NDIC Administration** – the application for NDIC environment administration
- **Simulations** – simulations and traffic data generating
- **Statistics** – operational overviews on the qualitative data related to traffic data

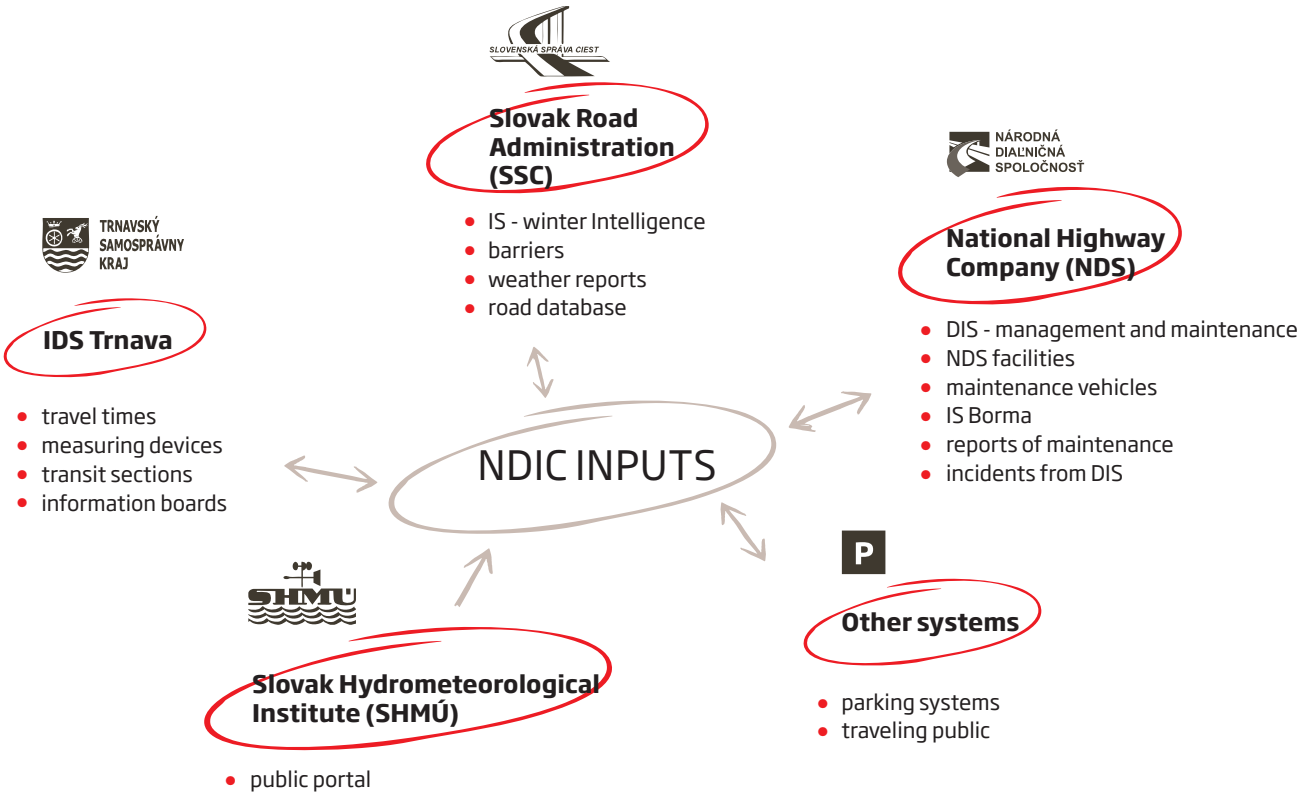
The modularly built cloud application infrastructure as well as the server aspect of the application logic belonging to created applications was behind a facade using the Windows Communication Foundation (WCF) system.
The design of the internal integral environment was adapted to a variety of already-mentioned demands. This environment is based on the asynchronous exchange of messages and events natural for the area of traffic data. Another task of same importance was the solution of creating a public website. It was built using the application framework ASP.NET MVC and extended with Ajax elements. Publication interfaces utilize the WCF system and provide traffic data for third parties through Datex II, TMC and TPEG protocols.

Benefits

- Consistent user interface for administration and control
- Constant status review of road traffic in the Slovak Republic
- Comprehensive overview of traffic at a particular point
- One transparent distribution point of verified traffic data
- Single method for the localisation of events in the Slovak Republic
- Introducing the situational dimension of traffic data in the Slovak Republic
- Decision-making support for investment projects
- Assessment of the transport system

Other benefits of the solution

- The ability to measure, track, control, inform and to influence traffic status
- Introducing the DATEX II standard
- One of the first countries in the world to publish traffic data in the new standard TPEG
- Creating a consistent application environment
- Including situation data into traffic data, and solving the synergy between the traffic data and its statistical aggregations
- Increasing road transport safety and continuity



Summary

The solution has met the specified expectations beyond the expected framework. In addition to answering all set questions the PNDIC project has proven to be the right integration platform for the centralization of traffic data originating from all involved agenda systems, having integrated up to 12 different information systems from 4 companies. The international standard for DATEX II transport was successfully implemented during the project and is nowadays used in Slovakia to a greater extent due to this project.

"The created solution met our expectations and confirmed that there is no technical or professional obstacle to implementing the technologies of intelligent transport systems in Slovakia in accordance with Commission Directive EC 40/2009. The realization of the PNDIC project according to specification was meant to be only a test of the implementation of a modern IKT, but the results achieved have proven its ability to serve as the functional basis for a future solution. The Pilot Project of the National Transport and Information Center (PNDIC) has particularly convinced us through the complexity of the collection, processing and distribution of traffic data; it means the entire life cycle of traffic data; and this includes the added value of situation information within the data, which did not exist in Slovakia before," commented Mr Peter Bäck, Director of Information Technology for the Ministry of Transport, Construction and Regional Development of the Slovak Republic.

"We have achieved the creation of a unique solution to the issue of transport information and transport-related data with an emphasis on its central collection, standardisation, processing and subsequent distribution for all involved information systems. Thus we have created a complex system providing the customer with all the current relevant data needed for his decisions, at the same time providing information for all parties involved in the process of solving a particular incident," commented Mr Alojz Časný, Senior Business Specialist, TEMPEST.

Products and Technologies

- Biztalk Server 2010 Enterprise
- MS SQL 2008 R2 Enterprise
- Windows Server 2008 R2 Enterprise
- Windows Communication Foundation
- .NET Framework 4.0
- ASP.NET, ASP.NET MVC 3.0
- Internet Information Services 7.5
- Active Directory 2008

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