

# DATEX2.TOOLKIT – A WORKING EXAMPLE OF DATEX2

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## ABSTRACT

The evolution of Traffic Control Systems (TCS) enables new opportunities for collaboration between road operators, drivers, government authorities, broadcasters and general users, but also presents a need for tools and solutions to share information in an efficient and standardised way. Several projects have addressed these needs, such as DATEX, OTAP, TPEG and DATEX2, providing specifications, demonstrators and solutions to implement traffic data exchange systems and services on a European scale.

Operating upon the same principle, these projects provide a platform integrated with Traffic Control Centres (TCC) applications to capture specific and heterogeneous traffic data formats, convert these into standard formats and transport and communicate them to various traffic agents. As data exchange solutions, they also need to provide additional support mechanisms for monitoring, security and information integration.

Road operators today are faced with the challenge of implementing solutions which facilitate collaboration with a range of organisations. DATEX2 is the most recent specification which enables road operators to communicate information (situations, elaborated data, measures, locations, and others) with other agents using the latest technologies, such as internet, wireless communications and Service Oriented Architectures (SOA) based on XML and web services technologies.

## INTRODUCTION

DATEX (DATA EXchange) is a protocol which defines a methodology for traffic and travel data exchange. The set of specifications comprising DATEX were defined under European Commission sponsorship in a research and development project that brought together several organisations from various European countries.

After an intense cycle of revisions, two documents – the DATEX Data Dictionary and DATEX NET specification – were submitted to CEN and defined as pre-standards. The Data Dictionary defines terms and attributes for the data used to communicate traffic and travel information. The DATEX NET defines the methodology, functions and message structures for data exchange between traffic information service providers and Traffic Control Centers (TCCs).

DATEX2 emerged in response to the limitations of DATEX and lessons learned from its trial implementation. This version addresses the growing data needs of newer and more sophisticated traffic and travel systems applying more efficient interchange mechanisms such as XML over HTTP (web services).

## DATEX2 SPECIFICATION

DATEX2 defines a standard for the exchange of traffic and travel data in Europe. “The vision is to enable exchange information in an unambiguous manner whereby it is represented in common structures and users are able to fully understand the semantics and context of the information being exchanged”.

The DATEX2 working group has developed a new model containing solutions to facilitate data exchange. This model provides:

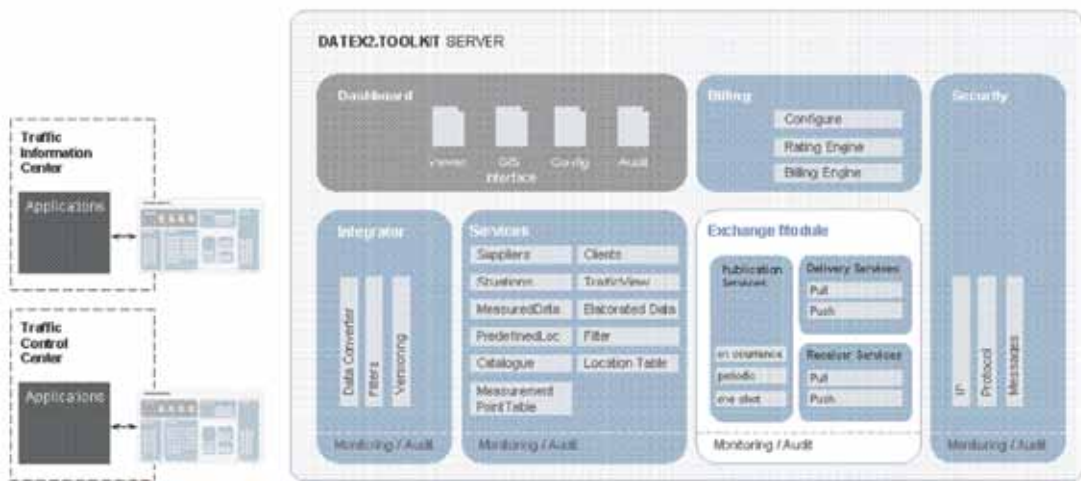
- A data model that embraces the needs of the majority of road operators across Europe;
- An architecture for exchanging data between suppliers and clients;
- An architecture that supports the most recent technologies;
- A broader range of localization types; and
- A guide to implementing solutions and products.

The architecture described in the DATEX2 specification defines:

- A UML model – This model describes the data format and content, which allows all agents to understand the information independently of its source. This model defines situations, traffic view, elaborated data, measures including meteor data, locations, and others.
- An exchange mechanism detailing supported operation modes (on occurrence, periodic), receivers and delivery services (Push and Pull).

## DATEX2.TOOLKIT IMPLEMENTATION

Brisa has developed a powerful, robust and reliable tool to enable traffic information exchange between suppliers and consumers (road operators, TCCS, TICS, incident handling teams and service providers) in a standard, accurate, secure and automated way. Known as the DATEX2.Toolkit, it is based on the DATEX2 Specification.



## DATEX2.TOOLKIT DASHBOARD

The D2T Dashboard allows full control and management of all information. Its main features include:

- Viewer – to browse, view, update and approve information to be sent and visualize the information received;
- GIS interface – interactive graphical maps for browsing traffic information;
- Configure / Admin – to manage information suppliers, configurations, backups, and others;
- Monitoring / Audit.

## DATEX2.TOOLKIT INTEGRATOR

The D2T Integrator consumes data from other formats and converts it into DATEX2. Its main features include:

- Data converter – Translates data, including location referencing tables and enumerations from the supplier's native format to DATEX2;
- Rules and filters – to define when and how information is integrated;
- Versioning – information version control;
- Monitoring / Audit – integrates mechanisms for information tracking and control;

## **DATEX2.TOOLKIT SERVICES**

D2T Services implement and support all publications to archive and manage the UML model defined by DATEX2.

## **DATEX2.TOOLKIT EXCHANGE**

D2T Exchange provides the interface for sending and receiving data in DATEX2 format. This component includes:

- Publication Services – these prepare data to be sent and can be published in 3 different modes (on occurrence, periodic, one shot);
- Delivery Services – data dissemination through “Pull” and “Push” methods;
- Receiver Services – these receive information from other suppliers and implement “Push” and “Pull” methods;
- Monitoring / Audit\_ System.

## **DATEX2.TOOLKIT BILLING**

The D2T Billing module offers essential billing options to suppliers, such as:

- Configure – defines billing rules, regulations and profiles;
- Rating engine – highly-configurable to rate any type of situation based on any customer or service attribute;
- Billing engine – to manage billing cycle dates and generate invoices to ERP systems;

## **DATEX2.TOOLKIT SECURITY**

D2T Security provides functionalities in order to guarantee the security of:

- IP – validating and controlling suppliers and clients IP Addresses of the suppliers and clients;
- Transport – granting security of the protocol being used, HTTP over SSL;
- Messages – credential validation at message level.

## CONCLUSIONS

DATEX2 brings enormous advantages to the various players in the traffic and travel information scene. These include not only traffic control and information centers but also news broadcasters, incident handling teams, firemen, etc. DATEX2 ensures that all agents speak the same language, thereby facilitating communication for optimum service provision.

The DATEX2 specification provides the foundation for a broader range of systems and applications targeting traffic and travel information. For instance, applications developed for mobile devices may use DATEX2 formatted information, receiving traffic and travel information and disseminating it to end users.

The DATEX2.Toolkit represents a successful implementation of the DATEX2 standard, whose added benefits are:

- Full implementation of the DATEX2 specification, creating data exchange links with corresponding systems throughout Europe;
- Offering additional components supporting new functionalities like monitoring, auditing and security;
- Ease of implementation of business models;
- Multiplatform;
- High availability, scalability and security.