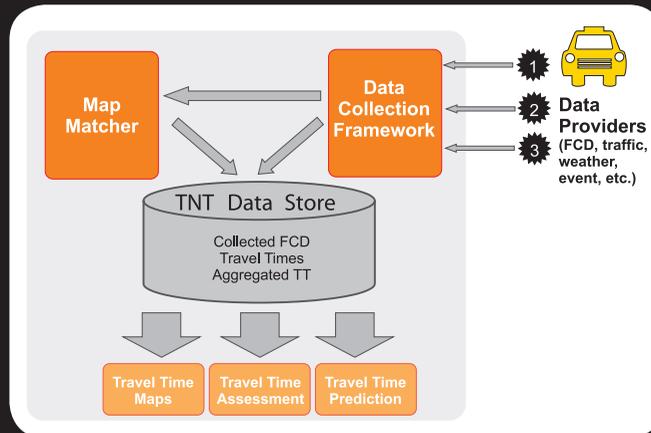




# The Project

The **TRACK&TRADE** project "Building a data mart for floating car data" is a **cooperative research project** funded by the **European Commission** under contract number COOP-CT-2006-032823.



The **project consortium** includes three research providers (RTDs) and five small and medium sized enterprises (SMEs).

The **scope of the project** is the development and creation of a **Web-based data, travel times, mart** for the collection of **Floating Car Data (FCD)** and the provision of **value-added services**.

A myriad of traffic-related services such as traffic management, traffic planning, the provision of services related to traffic such as navigational services, fleet management solutions and telematics services, or simply traffic news depend on the accurate assessment of traffic conditions. So far, this is achieved by establishing a costly, stationary sensor network covering the roads and areas in question.

The **TRACK&TRADE** project aims at exploiting the untapped resource of **FCD** as a cost-efficient means for accurate assessment of traffic conditions. To address the shortcomings of today's **FCD**-based systems, we advocate a **Web-based approach for the collection and exploitation of the large pool of existing Floating Car Data (FCD) sources**. **FCD** are data generated by tracking vehicles to sample the overall traffic conditions. Having large amounts of vehicles collecting such data for a given spatial area such as a city (e.g., taxis, public transport, utility vehicles, private vehicles) will create an accurate picture of the traffic condition in time and space. Although large volumes of such data do exist they have not been utilized and exploited yet.

# The TRACK&TRADE Approach

## Project Objective

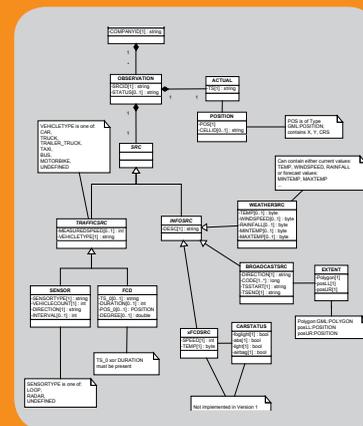
The **TRACK&TRADE** objective is the development and creation of

- a Web-based data mart for the collection of Floating Car Data (FCD)
- respective data management technology incl. map-matching
- value-added services creation based on dynamic travel times.

## Project Results

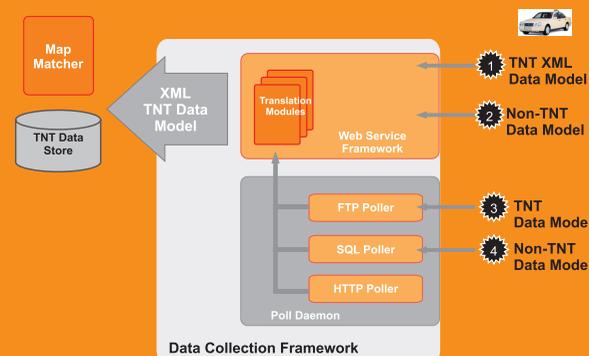
### Data Model

Based on data format surveys and requirements specifications towards the set of attributes required for a universal data collection format, an extensible **TRACK&TRADE data model** was defined. The XML-based model captures not only various types of **FCD** sources, but also traffic count information and related data such as weather information and TMC data.



### Data Collection Framework

Provides a maximum of flexibility for connecting new data sources by means of **three data collection alternatives**:



- **FCD source conforming to TRACK&TRADE Data Model** - SOAP/HTTP connection with template client interface provided.
- **Existing data source through Web service wrapper** installed at the source (push approach) - two levels to connect, (i) the communication layer - Web service client template adapted to the specific needs of the new source, e.g., wrapper for SQL cli-

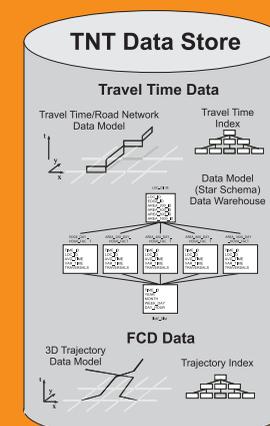
ent, (ii) the data model layer - a translator to provide mediation from data source to the **TRACK&TRADE** data model (server side).

- **Existing data source through polling** the data from the legacy source - examination of specific interface of the data provider and connection using a custom-built interface. **FCD** is polled by the data mart from the source, i.e., the data provider has no control over when to deliver his **FCD**.



### Map-Matching

Sophisticated map-matching algorithm relates **FCD** vehicle tracking data to road network. Algorithm tries to find a path in the road network matching most closely the vehicle trajectory. Curve matching algorithm uses the Fréchet distance function.



### Data Management

**TRACK&TRADE** Data Store manages road network, collected **FCD**, travel times and travel time aggregation. Use of spatial indexes and spatiotemporal data warehousing technology developed for this project.

### Service Framework

Algorithmic functionality specifically developed in this project includes:

- **Travel Time Maps** - a means to visualize traffic conditions
- **Travel Time Assessment** - provision of current travel times
- **Travel Time Prediction** - prediction of future travel times based on historic data causality



Provision of simple building blocks for new services (value-added services)

- **Basic blocks** - Access to computed travel times (API)
- **Intermediate blocks** - Algorithmic functionality based on travel times, e.g., routing, travel time supervision (API)
- **Advanced blocks** - GUI including advanced (Cruiser-based) visualization