Traffic Information Services

Industry Research Whitepaper

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Traffic information services

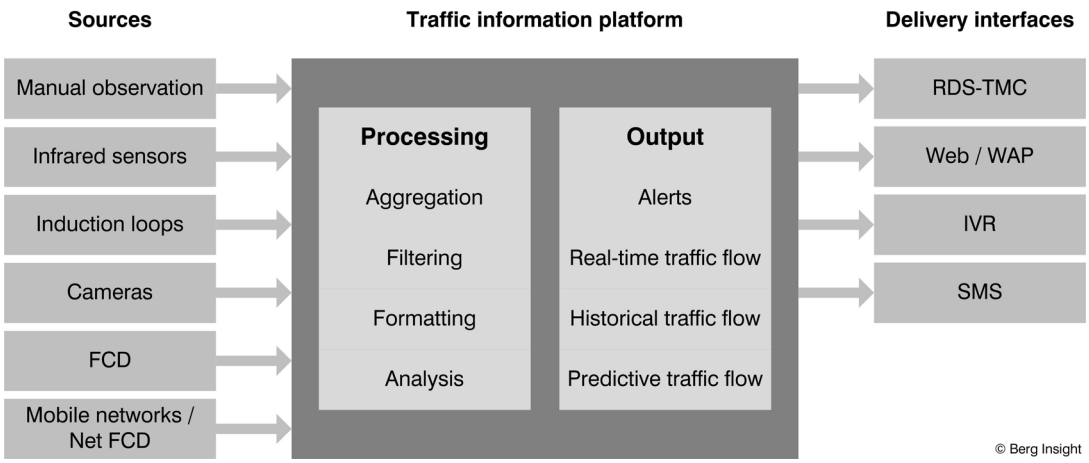
Accurate traffic information is a central component of intelligent transportation systems. Traffic information is a key component in operation and planning of infrastructure. Access to historic, predictive and real-time traffic information also enables navigation systems to calculate routes with the shortest travel time that enhances the experience for drivers. Today, both PNDs and in-dash navigation systems mainly rely on broadcast traffic information sent over FM radio or satellite radio using the TMC protocol. These services have reached extensive coverage in Europe and North America and now serve over 30 million users. Next generation traffic services will overcome the inherent restrictions of TMC over FM radio, notably low transmission speed and limited location codes resulting in low area resolution. The new TPEG protocol will remove the limitations of TMC, but also requires new information bearers with higher transmission throughput. Multiple new candidates exist, for instance broadcast technologies such as DAB, DMB, satellite radio or cellular networks. TPEG is already in use in Korea and Japan has deployed the indigenous VICS system.

Traffic information systems

Traffic information providers aggregate and process traffic data from multiple sources. The data is gathered from stationary detection systems, such as infrared sensors, induction loops, cameras, as well as vehicles and authorities that manually observe and report incidents and events that affect the traffic situation. Portions of motorways and major highways are usually covered by stationary sensors that measure traffic flow, average speeds, and distinguish cars from trucks. Another information source is floating car data (FCD) from vehicles equipped with GPS and telematics units. Availability of FCD information is growing rapidly as more and more companies install fleet management systems and an increasing share of cars are being equipped with telematics systems, connected PNDs and navigation-enabled handsets.

Several actors have also developed systems that generate traffic flow information from mobile network signalling data. The signalling data contains information about what macro-cell and cell in the network is serving each mobile phone. The network keeps track of the approximate location of each handset in order to route calls. This information, filtered to remove the identity of the user, can be used to measure traffic flow and average speeds.

Figure 1: Traffic information platform



Traffic data management centres collect data from the various sources and use historic as well as predictive data to generate traffic reports that are delivered to end-users through broadcast media or the Internet. Sourcing of traffic information with extensive coverage using only a few sources has been possible in North America. The European market on the other hand has been highly fragmented, requiring sourcing from multiple suppliers. However, several companies, for instance INRIX, NAVTEQ and TomTom, aim to provide aggregated services spanning multiple countries.

RDS-TMC services

RDS-TMC is a broadcasting technology for traffic information. RDS stands for Radio Data System and is a technology for broadcasting data information over normal FM radio channels. TMC stands for Traffic Message Channel and is normally a RDS based service for broadcasting real-time road and traffic information. In the US, TMC is also available via

satellite and HD radio. TMC traffic information providers usually get traffic information from central traffic information centres that collect the information from multiple sources such as traffic monitoring systems, emergency services or floating car data. The TMC provider generates TMC messages according to the ALERT-C protocol and passes the messages to radio broadcasters for transmission. The TMC messages consist of an event code and a location code. Event codes are descriptions of the traffic event such as congestion, roadwork and similar. Location codes specify the location of the event including road direction, effected distance and forecasted duration. In order to receive the messages, the user needs a navigation system with RDS-TMC capable radio receiver and map software that includes decoding tables for the TMC codes. Since the codes are standardised, the coded information can be presented in any language supported by the receiving unit. Therefore, users can access and use RDS-TMC traffic information in any country where the service is available.

RDS-TMC services are available in all of Western Europe with the exception of Portugal and Ireland. The systems are often operated by the national road administration in cooperation with public service broadcasters. Free service alternatives are available in many countries, while countries such as Finland, Norway, Sweden and the UK only have premium services. The main pricing model for premium services in Europe are one-time fees included in the price of the navigation device or in-dash system. It is also possible to purchase an RDS-TMC receiver that typically costs € 40–80 including lifetime access to services.

In North America, commercial traffic information services are delivered by Clear Channel Radio's Total Traffic Network, NAVTEQ Traffic and SIRIUS XM Satellite Radio. Total Traffic Network utilises FM RDS-TMC to provide services in 95 metropolitan areas in the US and Canada. RDS-TMC traffic services are gradually being deployed outside Europe and North America. Intelematics launched the SUNA traffic service in Australia in 2007. The Brazilian company Movix operates the INDICA TMC service for Mio PNDs since 2008. In South Africa, the stolen vehicle tracking and fleet management provider Altech Netstar has formed Altech Netstar Traffic together with ITIS. Real-time traffic services have been available since mid 2010 for handset navigation services and Garmin PNDs sold by Garmap.

Figure 2: TMC service providers in Europe (2010)

Country	Service provider	Public	Commercial
Austria	BMVIT	X	
Belgium	PEREX	X	
	TMobilis		X
	4FMTMC (Vialis)	X	
	VVC	X	
Czech Republic	TSK-PRAHA	X	
	Teleasist	X	
Denmark	Danish Road Directorate	X	
Finland	Mediamobile Nordic		X
France	V-Trafic (Mediamobile)		X
	ViaMichelin		X
	Autoroute operators	X	
Germany	Regional traffic ministries	X	
	TMCPro (NAVTEQ Traffic)		X
Hungary	TrafficNav		X
Italy	CCISS	X	
	Infoblu		X
Netherlands	TMC4U	X	
	ViaTMC (Vialis)	X	
Norway	Mediamobile Nordic		X
Poland	Mediamobile Nordic		X
Slovenia	TrafficNav		X
Spain	Traffic General Directorate	X	
Sweden	Mediamobile Nordic		X
Switzerland	Viasuisse	X	
UK	ITIS		X
	Trafficmaster		X

The TPEG standard

The European Broadcasting Union founded the Transport Protocol Experts Group (TPEG) in 1997 in order to develop a new Traffic and Travel Information (TTI) technology. The group has developed the TPEG Binary and tpegML specifications for language independent and multi-modal TTI. The Traveller Information Services Association (TISA) – a non-profit company – has taken over all the activities undertaken by the previous TMC Forum, TPEG Forum and the German Mobile.Info project. TISA works to ensure an international framework for market-driven, coordinated implementation of traffic and travel information services and products based on existing standards including RDS-TMC and TPEG. TISA also supports development and deployment of future standards and services. In South Korea, DMB (Digital Multimedia Broadcasting) – a digital radio transmission technology for TV, radio and datacasting to mobile devices – has been used to deliver TPEG services since 2006.

The TPEG specifications are partly based on RDS-TMC but introduce higher content detail and remove the need for a common location database stored in the client devices that have to match that of the information provider. The TPEG Binary standard was originally developed for Digital Radio delivery and the tpegML standard was developed for Internet bearers and message generation based on XML. TPEG is specifically designed for use on digital broadcast systems that provide a transparent data channel, for instance DAB, DVB or even the Internet. TPEG technology is standardised in two CEN and ISO Technical Specifications, comprising ten parts describing multiple applications. The RTM (Road Traffic Message) application provides a wide range of traffic information, such as accidents, obstructions and congestions. The PTI (Public Transport Information) application deals with service information for public transport including rail, bus, air traffic and ferry services. Other applications include TEC (Traffic Event Compact) for traffic event information primarily aimed at dynamic route guidance navigation devices, PKI (Parking Information) providing information about parking facilities, and CTT (Congestion and Travel Time) providing information on congestion levels and journey times. A common Location Referencing method is specified separately of the applications. AGORA-C dynamic references enables systems to refer to locations without defining them in advance and without knowing which particular map database is stored in the device to be used to present the information to the user. TomTom has also introduced the OpenLR dynamic location reference technology, which is open source and royalty free.

Cellular connectivity enables new business models

Today, most PNDs and in-dash navigation systems receive traffic information via RDS-TMC. However, connected PNDs and smartphones with cellular connectivity are not limited by the low transfer rates of FM radio and are thus capable of receiving high-quality, real-time traffic flow information and also contribute to data collection by sending anonymous data back to the service providers. Navigation device and application providers can therefore offset the price of traffic information by contributing probe data from their user base. Cellular connectivity also enables implementation of interactive ad-funded services.