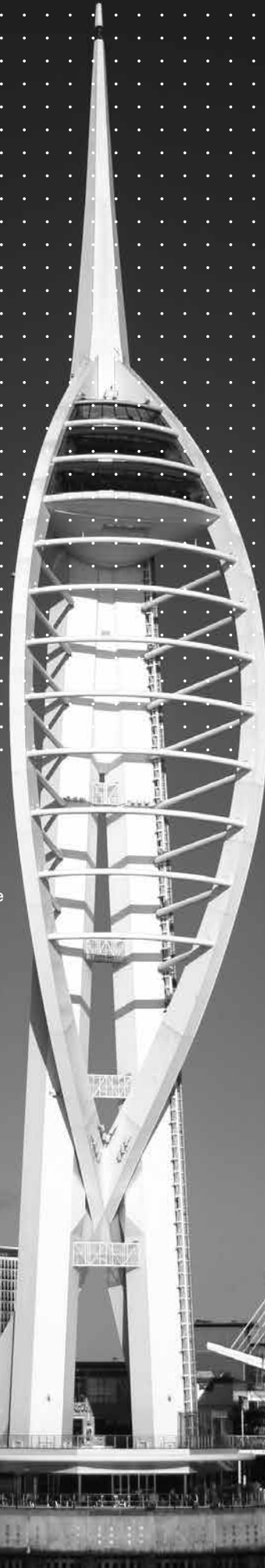


REAL TIME IN



GB

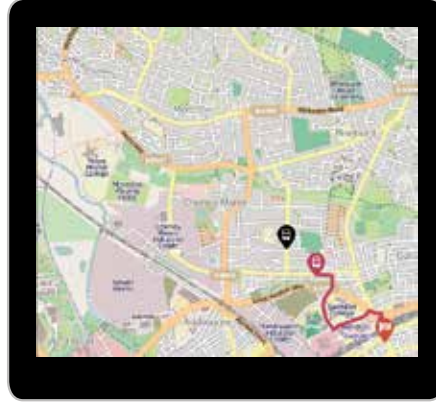
Region South West, Great Britain

Customer	Traveline South West
Project Scope	Supply a data broker and integrate real-time data to EFA
Key Figures	5.34 mil. inhabitants 24.000 sq km area Important locations: Stonehenge, Tintagel (Arthurian Legend), Salisbury Cathedral
MENTZ Contact	Andreas Kunde kunde@mentz.net

Customer Project

Real-Time for
Traveline South West, GB

In England's South West there are many decentralized operating systems for real-time data supply of departure boards and other services. The dynamic data integration platform DDIP is England's first region-wide and central operating system for the exchange of real-time information in public transport. A consumer of the information is the journey planner system, Traveline South West.



'Where is my bus?' – changing vehicle location of a journey as depicted in the responsive Traveline South West layout

With nearly 24,000 square Kilometers, the South West is the largest region in England. The size and historical character necessitate structural differences that are also reflected in the region's public transport. Easily accessible public transport (PT) in cities contrasts with very rural areas where transport services are correspondingly sparse.

The city of Bristol, as the most important economic zone, is one of nineteen transport authorities in the region for which the "South West Public Transport Information Ltd", or SWPTI, is responsible for coordinating public transport data. Since 2010, the authorities, which are integrated into city- and county councils in England, use the multi-tenant capable DIVA system to maintain and process the stop- and timetable data for the Traveline South West regional journey planner (cf. mdv News II/2010). In order to be supplied with real-time information, automated vehicle monitoring systems (AVMs) are available at the authorities and the largest bus companies: Stagecoach, First and GoAhead. The systems supply both local monitors/displays (PIS) and a nationwide mobile service for real-time bus departures, the so-called Nextbus system. Ever since bus deregulation in 1985, operations have been transferred into private hands. There are also many smaller bus operators that do not maintain their own AVM or supply an external AVM. Many of these smaller companies have a GPS-based electronic ticketing system (Electronic Ticket Machine- ETM) that centrally collects and transfers bus locations. Due to the current

budgetary policies it is necessary to consolidate and centralize the real-time data systems with their decentral organization at authorities and companies.

Although AVM systems are nearly comprehensive, an exchange of real-time data does not exist between authorities and companies and there is no supply to external systems, like EFA. The AVMs have put a focus on their own local areas, which results in cross border transport or other means of transport not being sufficiently covered. This situation should fundamentally change with the introduction of the DDIP. Real-time data should be centrally available in the future. During the concept phase, the following objectives were established between the SWPTI Ltd and MENTZ:

1. The dynamic data integration platform DDIP is to be centrally installed and operated at the SWPTI.
2. Via the DDIP an exchange of real-time data is enabled between the AVMs.
3. The entire real-time data exchange is based on the SIRI protocol.
4. A module is required to calculate real-time data from vehicle positions and make it available via interfaces that can be used by other systems.
5. The current number of 11 existing individual connections (per authority AVM) to the Nextbuses system are to run centrally over the DDIP. As a result, only one connection is required.
6. Local displays (PIS) will receive real-time via the DDIP and therefore also

SIRI

The Service Interface for Real Time Information or SIRI is an XML-protocol for the exchange of real-time data in public transport. Via a SIRI interface, two systems can exchange real-time information concerning the timetable, the vehicles and the routes of a transport authority.

Originally SIRI was developed by public transport companies and authorities from France, Germany (VDV), Scandinavia and the UK (RTIG). In October 2006, it was accepted as a European standard by the CEN with number CEN/TS 15531.

SIRI is based on the different national norms Transmodel, VDV453, VDV454, RTIGxml and Trident and has various functional services that are supported by MENTZ:

- Production Timetable [PT]: day-specific reference timetable
- Estimated Timetable [ET]: real-time information concerning timetables (prognoses, interruptions, etc.)
- Stop Timetable [ST]: stop-centered, planned departures and arrivals
- Stop Monitoring [SM]: real-time information concerning departures/arrivals at stops
- Vehicle Monitoring [VM]: real-time information and prognoses of vehicle movements (vehicle positions)
- Connection Timetable [CT]: planned connections
- Connection Monitoring [CM]: real-time for connections with a feature to communicate between arriving and waiting vehicle incl. feedback channel
- General Message [GM]: exchange of information messages
- Facility Monitoring [FM]: exchange of information for assets of stops, routes, etc.
- Situation Exchange [SX]: exchange of planned and unplanned events/works

be able to display the departures of other AVMs or other means of transport.

7. The real-time data should flow into Traveline South West (EFA) to increase the acceptance of the journey planner among the public and to contribute to sustainable development in the region.

These defined goals required a detailed analysis of the data situation, which MENTZ performed in collaboration with the regional specialists at SWPTI. As one of the first steps the system architecture was developed that includes the data flow from the available AVMs to the DDIP and the consuming systems Nextbuses, EFA and the displays. MENTZ AVM Light also served as a supplying AVM, which generates trip-based real-time information from bus positions and transfers it via a SIRI interface to the DDIP (Fig. 1).

The installation of DDIP, of AVM Light and the components required to operate EFA took place at SWPTI after procuring the required hardware. When the first data sets were flowing into the system, it was quickly apparent that all the real-time data sources are useful in their own way.

The operator AVMs and AVM Light are the main sources for the journey planner data. Conversely, the authority AVMs are the optimal source for the Nextbuses system. The displays (PIS) rely on all data that is available via the DDIP. This complex orchestration of real-time data flows can be assured with the existing DDIP based on SIRI (see explanation of SIRI).

As such, the integration of real-time data into the journey planner represents a special challenge. All available real-time data sources in the region must be collected by DDIP to form a consistent flow of real-time data and be transferred to EFA using a fail-proof subscription process. To achieve this, DDIP supports the SIRI function service 'estimated timetable' (ET). As soon as real-time data are available, departure boards and journey plans can be calculated considering the current network status. The departure board displays stop-based real-time information to notify users about possible delays. This information is especially helpful when passengers are already en route and need to know when their bus will arrive. It substitutes for a digital passenger information system (PIS) at stops (Fig. 2).

A planned journey not only displays route information, but also integrates delays, cancellations and other related data into the routing of the trip. Arrival and departure times are adjusted accordingly and new journeys are provided in cases where unforeseen transfers are required. The use of real-time data from DDIP in EFA enables special services like displaying the current location of buses. Since the real-time positions of buses are regularly adjusted in the new Traveline South West layout, users can effectively plan when to leave their home/office to catch the bus.

Currently there are several authority and operator AVMs connected to DDIP at SWPTI and their data are integrated into EFA. Work is ongoing to connect other smaller companies using AVM Light to the remaining real-time data sources of the region. As soon as the region-wide supply is complete, the AVMs of the transport authority and companies can exchange real-time information with one another. Indeed, a guaranteed connection can be realized using a duty SIRI CM supported in DDIP.

The integration of real-time for trains is planned as a next stage to further expand the offering of more reliable information in the Traveline South West journey planner. The railways in England have their own system (Darwin) to transfer the train movements and predictions to DDIP. As a result, there are no longer any limitations to the variety of potential services, they range from guardian angel and companion functions to notification services and changes to the timetable.

The complete package of services promises to achieve cost savings and advantages through process optimization in the organization of real-time data, but most importantly through sustainable and effi-

cient development of the journey planning system. The overall aim is to strengthen confidence in public transport.

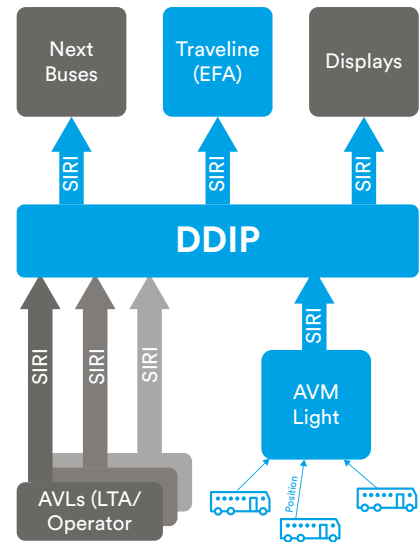


Figure 1: DDIP architecture, SWPTI

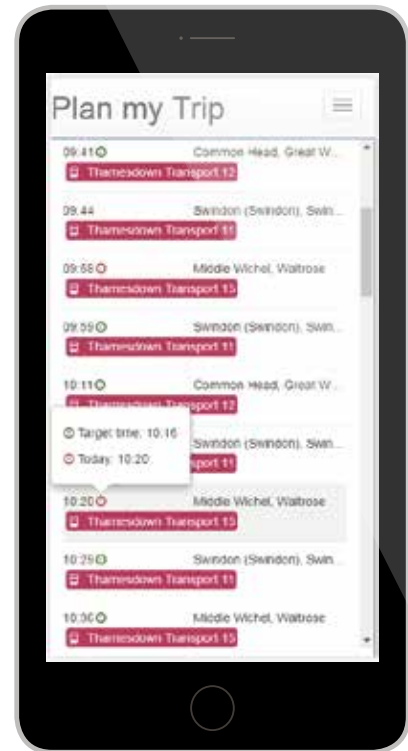


Figure 2: Real-time departure board in the responsive Traveline South West layout

We spoke to General Manager Ian Miller and Data Development Manager Andy Hole



Andy Hole, Data Development Manager



Ian Miller, General Manager

Why do you consider real time information as important for your system and the South West region?

Since being set up in 2000, Traveline South West has provided a comprehensive, integrated and impartial journey planning and timetable database service for all public transport journeys across the south west of England. The local transport authorities and operators who run the service have always looked to improve what is offered, to keep pace with the demands of users across the region. Initially, 99% of enquiries were made by telephone to our call centre. But growth in the everyday use of technology and digital media since then has seen use grow and switch to 99% via internet, text and mobile apps and devices, with less than 1% now being made by telephone. However, the service is still largely based on scheduled, timetabled information. Research conducted locally by SWPTI, who provide the Traveline SW service, has shown that users not only want accurate information provided across a range of channels, but that their expectation is for journey plans to reflect actual conditions on the day and to take account of changes almost as they happen. This is mirrored by the results of national research in the UK, by user's representative

body Transport Focus, for example. When this is compared to the fact that around 50% of our enquiries are for journeys within the next hour or two, it was clear to SWPTI that we needed to switch to using Real Time Information wherever possible to keep up with our market demands and raise our service to the next level.

What challenges were you facing during the implementation phase?

The SWPTI Board had a one-off opportunity in 2016 to make an investment to improve the Traveline SW offering using reserve funds, but needed a payback on that investment over the next 3 years or so in order to justify the expenditure. So, a proven system was required. However, there were challenges both in the provision of data to the DDIP system and in ensuring that data from smaller operators, who provide around 20% of bus services in the region, could take part via AVL so that our dataset remained as comprehensive as possible. When the SWPTI Board approved the purchase of DDIP earlier in 2016, there were potentially two ways of providing data feeds into DDIP. Unlike in most of the rest of Europe, the responsibility for the planning and operation of services largely rests with private sector operators, with larger companies having invested in their own vehicle location systems to aid performance monitoring. This would mean fewer data feeds overall, and make good use of investment in the "Ticketer" ETM with AVL capability for smaller operators by South West Smart Solutions Ltd. But it was relatively untried as a method. Alternatively, feeds could be taken from existing RTI schemes founded by Local Transport Authorities. This would mean that although these schemes were longstanding in some cases, it would mean procuring and managing a larger number of feeds and hoping that financial austerity for local authorities in the UK would not lead to the schemes ceasing and data drying up. In the end, the option to take data from operators where possible was taken, as this is judged to give longer term stability. There was also the challenge that SWPTI is a micro company without large resources to call on. But a combination of close working, input and advice from Mentz and wrapping our Data Manager, Andy Hole, in cotton wool to prevent damage during the project has meant that we have made progress! We are also in the process of updating our website and mo-

bile apps to give a more modern platform on which to present the upgraded data.

What are the next steps the South West region plans to take based on the available real time information?

The initial task was to display RTI in journey plans and departures across our websites and apps. We will now move on to provide a single, combined feed for the GB wide "Next Buses" platform, then investigate providing feeds to on-street signs and to areas without good RTI coverage at present. We also need to take account of any demands in the forthcoming Bus Service Bill in the UK, for example by enabling even smaller operators to provide audio visual "next stop" and route details on-bus. This will need careful planning and roll out as well as taking in further feed types from operators. However, the aim is to be able to provide output of Real Time Information on a consistent, comprehensive basis across our region, at a competitive cost to our Local Transport Authority partners. The win-win situation will be for DDIP/AVL to help secure SWPTI's funding and future, while providing an increased level of service to users and partners across the South West of England – but it will take more investment and hard work to achieve that goal.