

QUO VADIS SWITZERLAND

Customer Project

MENTZ is implementing the innovative QuoVadis project for the Swiss Federal Railway (SBB), an integrated system to publish all Swiss public transport information.

Switzerland, Basel

Product

DIVA as a data integration, management and publication system, EFA as an information system for version planning

Function

Early publication of timetable planning data for next year for contracting authorities and citizens

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From intercity to ski lift: an overview of Swiss public transport

Extensive and complex: the public transport offering in Switzerland is denser than in most other industrialised nations. So, having to create a timetable for all public transport services every year is a highly complex undertaking. In cooperation with MENTZ, the Swiss Federal Railway (SBB) has successfully taken up this challenge. In the technologically and organisationally innovative QuoVadis project, an integrated system has been developed for the publication of all Swiss public transport services on MENTZ's DIVA platform. Since May 2019, next year's timetable (2020) has been available for download as a PDF or via a web-based journey planner.



The Swiss Federal Railways are renowned for extraordinary precision and dependability. The expectations were just as high for the solution by MENTZ.

An extract of the key statistics for public transport in 2015 indicates the solution: integrating diverse data into a standardised information product that can be published using various channels. This requires reliable know-how and an innovative spirit.

The Commission

A new timetable, constructed during an intensive preparatory planning phase, is published annually for public transport in Switzerland. In order to facilitate the process, the Swiss Federal Office of Transport (FOT) has commissioned SBB to centrally publish all public transport services at this early planning stage. In this way, municipalities, cantons, and other interest groups have access to the planning data long before the timetable change. As soon as a first version of the data is available, a multi-stage coordination process is run between the FOT and the various transport companies. The current planning status is continually published on a publication portal until the timetable data is officially approved and then it transitions to the productive phase that results in the timetable change.

Initial Situation

A plethora of service providers are involved in Switzerland's comprehensive public transport system. The Federal Office of Statistics for the Swiss Confederation estimates that public transport accounted for 24% of the total volume of traffic in 2017. This comprehensive service is provided by a number of different transport providers. Their services are spread across rail, road, cable, and water-based public transport:

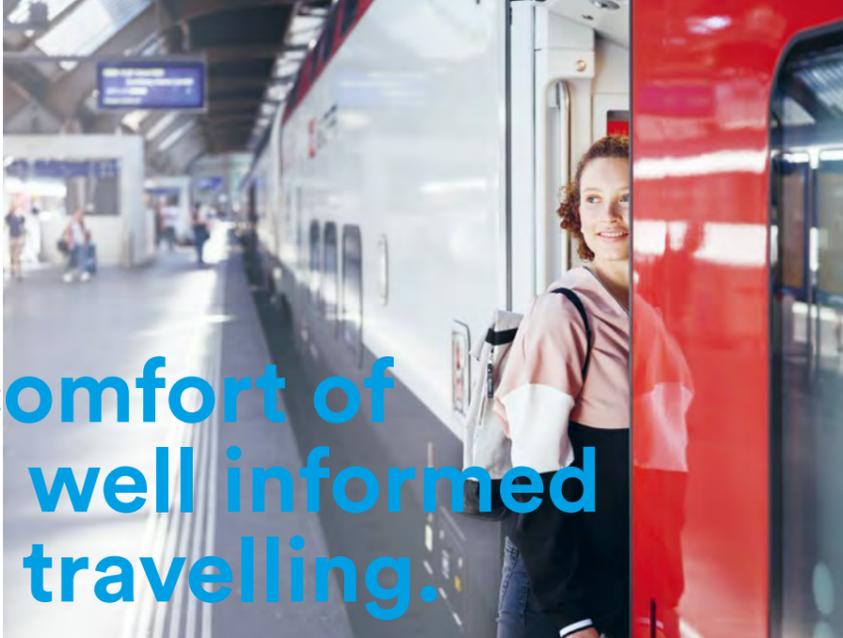
The Project

Until it is completed, the planning phase requires iterative evaluation and consolidation of the data. MENTZ is providing the requirement-specific system environment to ensure that the data is collected and prepared for publication. Applications, processes, and infrastructures were developed in the QuoVadis project, which was launched at the beginning of 2018. The objective: starting from May 2018, the implementation of all customer requirements within a planned project period of 18 months to be completed by a project team from the MENTZ offices in Zurich and Munich.

	 Rail: trains and rack railways	 Roads: trams, trolleys and buses	 Cables: cable cars and funiculars	 Water: boats and car ferries
Net length in km	5,323	21,529	983	562
Stops	1,838	21,846	...	328
Transport companies	74	133	225	32

Source: Federal Office of Statistics for the Swiss Confederation: extract from the annual public transport data for 2015

» The comfort of being well informed while travelling.



The Challenges

Which components are involved and what is the data flow?

The network structure and the establishment of data flows play an important role in the distributed QuoVadis system. The timetable information from all service providers in Switzerland is imported into the DIVA platform from SBB's central data collection system. The data is transferred in "Hafas Raw Data Format" (HRDF). The DIVA planning system stores the imported data as the basis for further processing. The consolidated information serves as a source for publication and journey planning.

How are the timetable data prepared?

The timetable is prepared using the new DIVA Client. The volume of Swiss data totals approximately 250,000 trips. The timetable blocks are constructed from the complete set of trips using the proven compositing technique. During compositing, trips from different routes are combined and stored as a separate route. The existing composite technique was expanded within this project in order to establish a conceptual difference between routes and trips.

How are conceptual differences bridged?

Problematically, in the HRDF format and within SBB's planning philosophy, there are only trips and not routes. Connections are modelled via route sections that are served by different trains. These trains either do not have a route number at all, or the planner does not know them. DIVA however, requires the route number as a main criterion.

Without this information, data is only accessible using workarounds, and for this reason a substantial reworking of the compositing technique was deemed necessary. This particular issue was solved with the "trip filter module". It allows direct access to the trips, even without the route numbers.

How are standardised routines for data preparation created?

Filters and search criteria support the data selection. The results then flow into the composites or connections. Similar to compositing instructions, the filters can be stored and reused. They can be recalled after each update of the DIVA original data from the SBB collection system and serve as a schema to construct timetable blocks. The output of the process generates almost 3,000 routes, which then are managed by the editors responsible for their publication.

Which challenges with regard to data presentation have to be overcome?

The publicly available trips from the railways occupy a large portion of the database. Their presentation presents the system with complex challenges: the publication of a high frequency train route between Bern and Zurich poses greater technical demands than the preparation of information for a single bus line. Many different types of trains with different train numbers, origins and destinations, day validities, and notes operate on the train route. All this information must be displayed for each trip.

How is a layout suitable for publication created?

One of the most challenging tasks during the project was to map all the conceiva-

ble variants using uniform presentation rules. Eventually, the project team was able to develop a uniform layout design in collaboration with the SBB via a separate working group. Like all standardising processes, the solution required compromises. Another important part of the project lay in finding an optimal balance between all the requirements. The effort required to follow through with these challenges is worth it because the advantages are obvious: the uniform solution significantly reduces manual effort during production, contributes to consistent recognition and is a decisive prerequisite for a barrier-free publication that is "simple and clear".

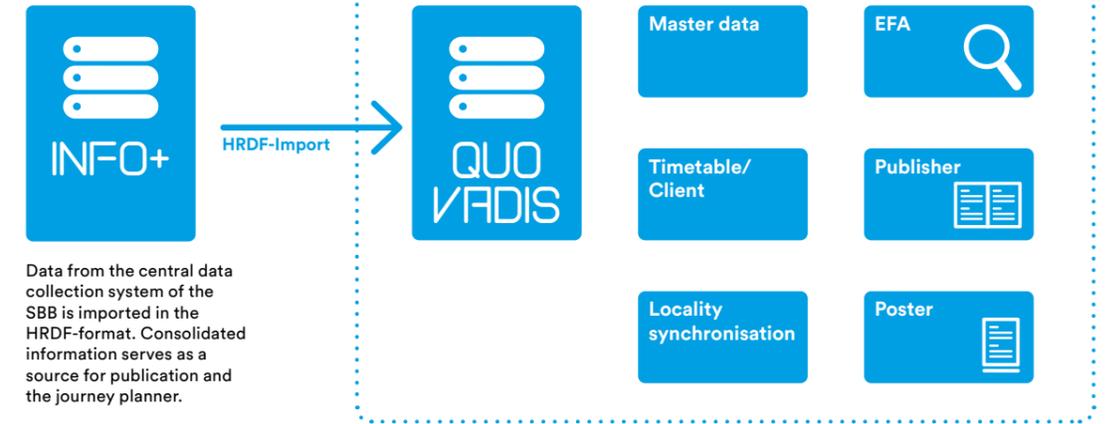
How are the timetable data published?

During the planning phase from May to mid-November, the timetable blocks generated in DIVA will be published via the www.fahrplanentwurf.ch portal. When the official timetable is published in mid-November, the timetables will be available at www.fahrplanfelder.ch

Additional planning data can be accessed using the EFA journey planner at www.fahrplanauskunft-öv.ch The data can be fully published via various media channels. The material is available to all interested parties in several different languages. In order to reach the public without any restrictions, the concept of cross-media access has been deeply embedded. The PDF files read-able using a screen reader and the layout design of the web-based journey planner demonstrate the effectiveness of the technical platform.



QuoVadis System Overview



The Technology

In the QuoVadis project, the design of the system modules and their underlying infrastructure follows the latest technological concepts. DIVA R18, which at that time was still in development, served as the base application from an early stage in the process. In addition to the latest application modules, the technical platform is also ground breaking. The system is based on a PostgreSQL database hosted in the cloud via Amazon Web Services (AWS). This solution has proven to be hassle-free, reliable and stable throughout the entire duration of the project. Such a positive experience re-affirms MENTZ's strategy to increasingly focus on powerful and flexible cloud technologies both now and in the future.

The solution creates the complete knowledge for a barrier-free publication.

The Method

Similar to the strength of the technical platform, the quality of cooperation amongst partners is crucial for the success of the project. For this reason, the SBB and MENTZ are committed to discovering innovative methods of cooperation. Project management and development are organised according to the scrum agile process framework. The core aspect of this method is close, regular and continuous communication within the entire project team, especially and across all roles such as project planners, business analysts and software developers. The intensive exchange of information fills the team's calendars with daily and weekly, forward-looking and retrospective rounds of planning. Demos, roadshows, and retrospectives bind all stakeholders into the project's progress.

The densely-structured coordination process is rather time-consuming for everyone involved, but it enables transparent, open communication and immediate feedback from the client and user. The result is a set of targeted interventions in short development cycles and, as a result, solutions are developed that meet the customer's specifications and expectations. The close working context of the agile process framework expressly acknowledges the fact that functional and technical requirements can change during the course of the project as the level of insight into the required solutions emerge. This methodology thus demands a high degree of flexibility and personal responsibility from all parties involved.



The Result

Consistent innovation in the project has paid off: milestones which have been successfully completed within the agreed time frame have proven the effectiveness of this method of collaborative working. The powerful technical platform makes it possible for up to 60 employees to work in parallel on the system before the major publication phases. The remaining work packages will be completed in 2019, and the first system enhancements have already been planned.

Cooperation between the SBB and MENTZ includes both the QuoVadis and other projects. After an invitation to tender in 2017, the SBB awarded a framework contract to MENTZ which includes a whole series of joint projects. What all these projects have in common is a focus on customer information. As part of the implementation process, technical solutions will be developed, most of which will be integrated as extensions to the DIVA/EFA standard products. Successful cooperation with the Swiss Federal Railways, a worldwide leader in the area of mobility, will also bear fruit for other MENTZ customers, as the innovations developed in the QuoVadis project will be available for all future projects.



Arrive fast and easy – with an info system that links different modes of transport.

fahrplanentwurf.ch



The DIVA timetable blocks are published. The planning data can also be accessed using the EFA journey planner (<http://fahrplanauskunft-öv.ch>). Complete publication of the data using different media channels can thus be achieved.



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Publication example for a cable car in Western Switzerland

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